CENTRAL NEW YORK

REGIONAL PLANNING AND DEVELOPMENT BOARD

COASTAL ZONE MANAGEMENT PROGRAM

PHASE I REPORT

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New York Coastal Zone Management Program

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CENTRAL NEW YORK
COASTAL ZONE MANAGEMENT PROGRAM
PHASE I
SUMMARY

COASTAL ZONE MANAGEMENT

The Coastal Zone Management Act (PL 92-583) was signed into law on October 21, 1972. Its passage was brought about by concern for, among other things, coastal habitats perceived to be in danger from overuse and poorly planned developments. Under the act, principal responsibility for coastal zone management is assigned to coastal states, which may apply for federal assistance to prepare and administer CZM programs developed through a process which meets federal criteria. The National Oceanic and Atmospheric Administration is the agency responsible for administering the program at the federal level.

In addition to states bordering on the Gulf of Mexico and the Atlantic and Pacific Oceans, those states which adjoin the Great Lakes are eligible to participate. New York State received its first grant under the CZM program in October 1974. Responsibility for its administration lies with the NYS Division of State Planning in the Department of State.

CENTRAL NEW YORK RPDB ROLE AND RESPONSIBILITY:

During the grant application process, CNY RPDB assisted in the review and development of the State's program, which provides funds to regional and county planning boards and other agencies to develop local programs, collect information from local areas, and eventually assist the State and local governments in carrying out a management program to guide land and water use activities based on attitudes and desires of citizens living in coastal areas. The RPDB received approval from the State last May for conducting coastal planning activities with the Cayuga and Oswego County Planning Boards.

As the comprehensive regional planning agency in Central New York, RPDB is concerned with all land and water use activities in the area, including that portion of the Region in Cayuga and Oswego Counties which adjoins Lake Ontario. As a participant in the CZM program during Phase I, RPDB conducted initial inventories and analyses of coastal characteristics, including information about land use and natural resources. In conjunction with the Cayuga and Oswego County Planning Boards, RPDB transmits all such information (included in this report) to the Division of State Planning (DSP).

Working with the DSP, the local Central New York agencies will formulate the guidelines and policies to incorporate in the Statewide coastal zone management program.

THE CENTRAL NEW YORK COASTLINE

The shoreline along Lake Ontario in Central New York varies considerably in its physiography, soils, vegetation, and hydrologic characteristics.

In combination, natural phenomena provide a variety of ecologic systems and landscape types. In addition, the introduction of man-made features also influences the coastline.

For study purposes, the CNY coastal area extends from the Wayne-Cayuga County border northeast to the Oswego-Jefferson County border. The actual inland extent of lake influence varies according to both type and intensity of that influence. For purposes of the CZM program, it is a relatively narrow band running 5 to 15 miles inland, and more or less parallel to the shoreline. (The criteria utilized to determine this are discussed in Technical Memo #2: Boundary).

The extremities of the study area contain bays and ponds with barrier sand beaches. These are dynamic areas in which major changes are observable over short periods of time. The western and eastern sides of Little Sodus Bay in Cayuga County have been stabilized by artificial break-waters and retaining walls. At the northeastern end of the study area, North and South Ponds, without artificial stabilization, are free to change their contours as Lake Ontario water levels and interior surface water runoff move, remove, and augment sand accumulations. As the resultant sand dunes change, so does vegetation. The two interact and influence each other as the dunes build up, stabilize and erode in a cyclical manner. This phenomenon is also discussed in Technical Memo #6.

Upland area, particularly in the western portion of the coastline, consist of eroding bluffs which are drumlins. Some of these have been artificially stabilized. The vegetation of these areas varies depending upon location and external influences. The lakeward sides of the drumlins are now exposed, rocky bluffs -- some as high as 30 feet. They are naturally a very dynamic feature of the landscape. Erosion at McIntyre Bluff is particularly striking. A few wetlands are also found in this area, the largest being Sterling Creek Marsh.

The principal urbanized area in the western portion of the study area is the Village of Fair Haven which is built around Little Sodus Bay. There is a marina on the Bay, and there are numerous scattered cottages in this area. Immediately to the east is Fair Haven State Park, a major recreational facility in this part of the State.

Approximately 12 miles northeast of Fair Haven is the City of Oswego which is situated on the mouth of the Oswego River. The city has a population of nearly 25,000; a minor Great Lakes port is operated there (see Technical Memo #8: Land Use).

Upland areas northeast of Oswego consist of a generally flat, low-lying lake plain with the soils comprising a thin layer over bedrock; there are rock ledges adjacent to Lake Ontario. The Nine Mile Point power plant site is located here on bluffs which are generally not as high as those found to the west.

All upland areas along the lake are characterized by extensive fresh water wetlands. These marshes vary in character, soils, vegetation, and physical properties, and provide many different habitats for coastal birds and animals. Another variable is these wetland areas is the successional stage of vegetation with several stages often found in one wetland. (Sixteen coastal wetlands are described in greater detail in Technical Memo #3). Shoreline wetlands serve as the mouth and channel for many of the streams and rivers that comprise the eastern Lake Ontario drainage basin.

Towards the northern end of the study area are two relatively major streams: The Little Salmon and Salmon Rivers. Both provide recreational opportunity for sport fishing. The Salmon River is a large watershed, originating in and draining much of the Tug Hill Plateau in Oswego County. A hydro-electric facility is located on the Salmon River Reservoir, some 15 miles inland from the shore.

Just south of the Salmon River is Selkirk Shores State Park. Like Fair-Haven State Park, Selkirk Shores is an important recreational facility on the eastern Lake Ontario coast.

The entire coastal area once consisted of typical Northern Forest types found throughout Central New York, although here somewhat modified by the milder climate brought upon by Lake Ontario. The area is generally undeveloped and rural in character except for the city of Oswego. There are several villages located on or adjacent to the shore, and there are numerous scattered cottages. Most of the initial changes to the natural landscape were for agricultural purposes (clearing of trees and so on). However, farming has declined and continues to decline: it is no longer the dominant activity along the lakeshore. As one goes away from the shore, the incidence of farming activities increases. This is probably due to less demand for the land for competing activities rather than for inherent agricultural land value differences. The abandonment of farms has led to large areas of open space once used for pasture and tilled fields. These are now succeeding into brush, followed by second-growth trees that in a few years may return parts of the area to its original wooded state. Certain other areas, particularly those located in close proximity to the Lake or on larger streams, will come under pressure for development of residential and commercial uses. The coastal zone management program will lend guidance for more orderly, rational development of land and water use activities.

STUDY OBJECTIVES

The Central New York Coastal Zone Management Program has several objectives, in terms of both effecting desirable coastal development practices and those that relate to accomplishing tasks and obtaining certain products from the study process. Before initiating work on the program the RPDB, in concert with the State, established four broad goals within which specific objectives and task items, or policies, were identified. Briefly, these goals relate to the conservation of coastal natural resources, the provision of opportunities for the public to use and enjoy coastal amenities, the promotion of the general public welfare and economic development of a management program to ensure orderly implementation of the other goals and objectives. (Technical Memo #1 describes more fully goals, objectives, and policies).

Within the above framework, during Phase I RPDB sought to collect information and establish the data base necessary to identify coastal problems and issues to be addressed in a management program. Basically, the objectives of this study were:

(1) to develop an understanding of Central New York coastal characteristics, including natural resources and land and water use activities .

(2) to identify specific problems and problem areas.

(3) to identify those characteristics which can be used to determine the inland extent of lake influences and recommend a "coastal zone".

(4) to determine what and how agencies and institutions affect changes in coastal land and water uses and activities.

(5) to make tentative recommendations on appropriate courses of action to achieve goals and objectives in coastal areas.

(6) to identify where available information is inadequate and recommend subsequent activities in order to carry on the coastal zone management program.

STUDY ACTIVITIES AND APPROACH

This report identifies activities undertaken during the first year of the Central New York Coastal Zone Management Program. Phase I activities were conducted in accordance with a work program identifying specific tasks to be completed. The following lists those tasks and describes their products.

In some cases, work performed is reflected in the series of nine technical memoranda contained in this report; other activities are described below.

Task 3.2 -- Public Participation: Establish schedule of public meetings, conferences, and workshops on Coastal Zone Management.

RPDB established a Coastal Zone Management Technical Advisory Committee comprised of five citizens from Cayuga and Oswego Counties. The role of the TAC is to advise and assist the staffs of the RPDB and Cayuga and Oswego County Planning Boards in conducting the CZM program. The TAC members include: a member of the NYS Assembly, a member of the Oswego County Legislature, a professor from SUNY at Oswego and director of the Lake Ontario Environmental Laboratory, a member of the League of Women Voters, a former superintendent of Fair Haven State Park. Four of the TAC members are also members of their respective county planning board and/or the RPDB board. The TAC met together several times during Phase I with various staff people.

Other public participation efforts have included public meetings and innumerable discussions with agencies and public and private groups interested in coastal planning.

Task 4.2 -- Intergovernmental Process: Review and analyze Regional, County, and local comprehensive plans, zoning, and subdivision ordinances, and other programs and activities.

The RPDB approached the aspect of intergovernmental process in two ways. First, in order to help ensure that coastal planning activities are conducted in a cooperative and coordinated manner, RPDB participated in many discussions with a variety of governmental agencies concerned with coastal problems. These included such agencies as the St. Lawrence-Eastern Ontario Commission, NYS Department of Environmental Conservation, Black River-St. Lawrence Regional Planning Board, Genesee-Finger Lakes Regional Planning Board, the Jefferson County Planning Board, NYS Sea Grant, and local town and village departments and agencies.

The second approach is related more directly to assessing formal institutional influences on coastal activities. As indicated in Technical Memo # 7: Governmental Process, RPDB assembled and analyzed information on zoning, subdivision regulations, and other ordinances, and on land use and other types of plans related to development in CNY coastal areas. This kind of information is important to assessing the extent to which procedures have been established for guiding development in a rational fashion in coastal areas, and, based upon CZM objectives, indicate where additional development guidelines may be needed.

Task 6.2 - Coastal Zone Boundaries: Identify criteria to determine coastal zone; discuss and analyze criteria. Map possible coastal zone boundaries and discuss them with county planning boards, SLEOC, and other governmental units. Determine tentative coastal zone boundary for Central New York.

As discussed in Technical Memo #2: Coastal Zone Boundary, RPDB outlined those factors, including federal and state guidelines, that can be used to determine a coastal zone boundary. The memo describes consideration of various interpretations of the factors, or criteria, and presents three optional boundary lines. For study purposes, a tentative boundary was selected to guide the inventory and analyses conducted in Phase I. The option utilized for this purpose is the largest of the three; i.e., its inland extent is the greatest.

Task 7.3 -- Analysis of Natural Resources: Map and analyze geographic areas of particular concern for their natural resource values (where such information exists), and identify areas where further field work may be necessary by CNY RPDB and Cayuga and Oswego counties.

Task 7.4 -- Analysis of Natural Resources: Prepare interim technical reports on various aspects of natural resources as a basis for further designation of priorities, and permissible/prohibited uses.

Work on these particular task items reflected in several of the technical memoranda: #3 : Coastal Wetlands, #4 : Hydrology, #5 : Soils and Geology, #6: Wildlife and Vegetation, #8: Land and Waters Use, and #9: Areas of

Particular Concern. Each of the memos provides a description and analysis of the natural resource type identified. To the extent that information was available, tentative bases were established for the identification of potential (or current) conflicts between existing and possible future land and water uses, and the existence and characteristics of the natural features. In addition to the memos, and to aid in the analyses, large scale maps were prepared depicting the information. The significance of these natural resources and potential conflicts was evaluated relative to coastal goals and objectives. Based on this comparison, recommendations are included in the technical memos.

> Task 8.1 -- Analysis of Land and Water Uses: Identify potential development areas and potential conflicts between natural resource considerations and economic or other activities.

This particular activity was initiated by gathering and analyzing current coastal land and water use information. In conjunction with other activities, especially those relating to natural resources, RPDB analyzed potential land-water/natural resource conflicts. For the most part, current land and water uses are discussed in Technical Memo #8. Large scale maps have been prepared in conjunction with this task depicting current and potential activities and land use in coastal areas.

Technical Memo #9: Areas of Particular Concern describes a methodology for identifying and more explicitly describing areas important for either their natural, economic, or cultural values in the Coastal Zone. Phase II of the CNY CZM program will be addressed to incorporating this methodology in the coastal planning process and providing definitive descriptions of these areas. Considerable input to Task 8.1 was derived from Technical Memos #3, #4, #5, and #6, since information derived from them helps formulate the basis for areas of particular concern. It is really those areas not of particular concern which are more suitable for development.

Technical Memo #8, Land and Water Use, provides a discussion of areas identified for potential development. Through refinement of the critical areas methodology in Phase II, these may be revised. Technical Memo #9, Areas of Particular Concern, identifies potential conflicts between natural resource considerations and economic or other activities.

Technical memo #3 identifies and discusses wetlands in the coastal zone. These wetlands are important resources and are highly vulnerable to encroachment and damage. Potentially, most wetlands can be drained, filled, dyked, dredged, or converted to other types of land and water uses. Accordingly, the New York State Wetlands Act was passed in an effort to protect the State's wetland resources.

All of the wetlands inventoried in the coastal zone (see technical memo #3) are extremely important resources, and as such, are considered areas of particular concern.

Hydrologic characteristics of the coastal zone are described in technical memo #4. Coastal hydrology is important in identifying areas of particular concern since it is important in determining the quantity and quality of surface and groundwater supplies. Characteristics of surface water phenomena and aquifers and aquifer recharge areas are important determinants in making recommendations concerning type and extent of development. Hydrologic characteristics also indicate potential hazards to human activity e.g., flooding. These areas are analyzed in detail in technical memo #4. A map is included which shows the hydrologic characteristics and the areas they affect. These areas are listed as areas of particular concern in technical memo #9.

Coastal soils and geology determine to a large extent potentials and limitations for land use. Many soils are subject to flooding, have poor compactibility, excessive or insufficient permeability, or are subject to erosion. In addition, geologic characteristics such as rockiness, steepness or underlying formations can present hazards to development. Technical memo #5 identifies soils and geology in the coastal zone. This information was used to determine areas of particular concern.

Coastal areas exhibit an abundance of vegetation and wildlife often not found in other places. In addition to their intrinsic qualities which make a variety of species important, wildlife and vegetation are valuable as providers of recreational opportunities for residents and visitors to the coastal zone. Many flora and fauna are also fragile resources which, if encroached upon, can be easily destroyed.

Technical memo #6 identifies species of flora and fauna in the coastal zone and their habitats. These habitats (see technical memo #6) are considered to be areas of particular concern, and are identified on maps both in technical memos #5 and #9.

In order to better plan for future coastal land/water uses and activities, it is necessary to analyze coastal land/water use characteristics.

In many instances, information on agriculture, forests, historic sites, etc. demonstrates a need to preserve or enhance certain land uses. Technical memo #8 analyzes land/water use in the coastal zone and provides a basis for selection of certain uses as areas of particular concern.

RECOMMENDATIONS

The analyses described in the technical memoranda included in this report provided a series of findings which relate to coastal land and water uses and natural resource considerations. Based upon such information, several recommendations can be made relative to the subject matter itself, and the need for further study. Presented below are recommendations, by subject, for the work carried out in Phase I. Such recommendations should be advanced during subsequent phases of the CZM program.

PUBLIC PARTICIPATION

1. TAC Activities

   -- The role of present CZM TAC as a provider and facilitator of citizen inputs to CZM planning process should be expanded.

-- Continue to hold public meetings

2. CZM TAC Membership Expansion

-- Specific types of individuals should be added to existing TAC membership (five individuals) to represent business, agriculture, government, and special interest groups.

GOVERNMENTAL PROCESS

1. Local Governments

-- A committee advisory to CZM program composed of local government officials should be established.

2. Interagency Coordination

-- Periodically, meetings should be held with other state, regional, and local agencies involved in activities affecting CNY coastal areas.

-- CZM Contractors should participate in project review of proposed development projects in Coastal areas through A-95 Clearinghouse Procedures.

COASTAL ZONE BOUNDARIES

1. Public Review

-- In conjunction with Public Participation and governmental Process Activities, DSP should conduct public meetings on selection of coastal zone boundaries.

NATURAL RESOURCES

1. Coastal Wetlands

-- CZM contractors should refine criteria to delineate wetlands as areas of particular concern.

-- CZM contractors should, in conjunction with wildlife/vegetation activity, refine procedures for designation of specific wetland/ habitat types

-- Coordinate CZM with activities of SUC Oswego Study and other relevant activities.

-- Wetlands in general should be regarded as critical areas and should be kept free from infringement of land uses which result in drainage, dredging, pollution, destruction of wildlife habitat, and/or flooding.

-- The following wetlands should be acquired under the NYS Environmental Bond Act:

a. Deer Creek Marsh (1200 acres)
b. Snake Creek Marsh (131 acres)

c. Butterfly Marsh (300 acres)
d. Grindstone Creek Marsh (131 acres)

-- Detailed investigations of flora and fauna should be undertaken by the NYS DEC and/or other appropriate agency(ies) to determine wetland importance as habitat areas.

-- Central New York Coastal Zone Management Program should continue to incorporate new data into the development of a management program as information on wetlands becomes available. Specifically, a monitoring and updating mechanism should be developed in cooperation with other existing or potential investigators, including NYS DEC, SUC at Oswego (NSF Study), and others.

-- CNY CZM contractors should participate in NYS Freshwater Wetlands Program implementation as a party-of-interest involving any coastal wetland.

2. Surface Drainage and Hydrology

-- Stream gaging data should be obtained for several small watersheds in the coastal zone for use in determining stage and discharges and as an aid in delineation of flood hazard areas.

-- CZM program should be coordinated with the HUD mapping program for NFIP

-- Efforts to ensure local compliance with NFIP regulations should be increased.

-- Detailed information on coastal groundwater supplies should be obtained to identify those resources most valuable as sources of domestic and/or municipal water supply.

3. Coastal Soils

-- Certain soils which cannot be upgraded through normal management practices for intensive use should be regarded as areas of particular concern and as such should be kept free from land uses which will result in damage to either the development of the environment.

-- Detailed investigations and mapping should be done in the coastal zone so that the information can be used for operational planning.

-- Soils of a texture and topography susceptible to erodibility should be isolated and managed so that sedimentation can be controlled and development on them can be limited.

-- Soils which are highly suitable for certain activities should be objects of management practices which encourage such activities, subject to the overall needs of the coastal zone.

4. Wildlife and Vegetation

-- A complete inventory should be taken of all habitats in the coastal zone.

-- The State should pass an Endangered species Act to protect endangered plants and animals in New York State.

-- A preserve system should be established to protect all significant wildlife habitats.

-- Maintenance of clean waters and air should be as extensive as possible in regions containing important wildlife habitats.

-- The accessibility of good wildlife habitat to the public (for hunting or viewing), along with access to lakes and streams should be expanded taking into account good conservation principles.

5. Physical Features

-- CZM contractors should incorporate detailed inventory of coastal geologic and physiographic features into CZM program.

-- Criteria should be developed to determine importance and uniqueness of physical features.

6. Scenic Areas

-- Inventory of scenic areas should be refined for CZM program

-- CZM contractors should develop mechanism to preserve or enhance scenic areas, including vistas and transportation corridors.

7. Sand Dunes

-- CZM contractors should more explicitly identify problems and issues involving sand dunes.

LAND USE AND WATER USE

1. Inventory

-- In selected areas, particularly in immediate proximaty to the shoreline, detailed land use information should be acquired.

2. Analysis

-- Utilize detailed land use information at a scale adequate to make site specific analyses and recommendations.

-- Incorporate land use and natural resource data in methodology to make determinations about areas of particular concern.

AREAS OF PARTICULAR CONCERN

1. Expand utilization of methodology developed in Phase I of CNY CZM program.

-- Extensive data should be assimilated identifying resources and land uses in the coastal zone.

-- Refine and expand the methodology suggested in this report for determining areas of particular concern through a more comprehensive inventory and analysis of resources in the coastal zone.

-- A pilot study should be undertaken to test the methodology's applicability to coastal zone management and planning.

-- Coordinate aspects of our 208 program, 701 program, and Upstate Port Study in consideration of environmental and other issues relative to areas of particular concern.

-- Incorporate information from other task items in natural resources and land use into methodology.

-- Continue development of criticality matrices for other categories.

GOALS -- OBJECTIVES -- POLICIES

CENTRAL NEW YORK COASTAL ZONE MANAGEMENT PROGRAM

PHASE I: TECHNICAL MEMO #1

AUGUST 1975

INTRODUCTION

Purpose and Scope

The Central New York Coastal Zone Management Program operates in accordance with various federal and state objectives. According to the CZM Act of 1972, it is national policy to preserve, protect, develop, and restore the resources of the Country's coastal zone, and through development and implementation of a state management program, achieve the wise use of land and water resources of the coastal zone.

This memo, then, is an interpretation of the federal and state guidelines. The goals, objectives, and policies outlined below indicate the principles by which coastal planning and management will be carried out by the CNY RPDB. The memo presents four broad goals for the CNY Coastal Zone, one each pertaining to natural resources, public access, public welfare and economic well-being, and development of management program; in addition, included are specific program objectives and recommend task activities to be carried out under the work programs for both Phase I and subsequent phases.

CENTRAL NEW YORK COASTAL ZONE MANAGEMENT
GOALS -- OBJECTIVES -- POLICIES

PRINCIPAL POLICY

The principal policy in the development of the Central New York Coastal Zone Management Program shall be for the "coastal zone" -- including immediate water areas, the coastline, and adjacent land and inland water areas -- to be treated as a composite of unique resources of areawide significance, available for the benefit of all residents and visitors.

GOALS AND OBJECTIVES

GOAL: The protection, conservation, enhancement, development and, where possible, restoration of the natural resources of the Central New York coastal zone for the present and the future.

OBJECTIVES: 1. Protection and enhancement of coastal wetlands

Policies:

(a) Determine uniqueness and relative value of coastal wetlands to designate those important to the Central New York coastal zone;

(b) Promote preservation of coastal wetlands through public acquisition;

(c) Promote the conservation and wise use of coastal wetlands through enforcement of existing federal and state legislation and the application of suitable management techniques;

(d) Promote the adoption, and enforcement of existing local laws which regulate access and infringement in wetland areas.

2. Protection and enhancement of vegetation and wildlife habitats and fish spawning areas

Policies:

(a) Determine uniqueness and relative value of wildlife habitat areas to designate those important to the Central New York coastal zone;

(b) Promote protection and enhancement of unique wildlife habitats through application of suitable management practice;

(c) Promote preservation and enhancement of endangered vegetation and wildlife species through enforcement of applicable federal and state legislation.

3. Protection of distinct or unique physiographic formations and features

Policies:

(a) Identify unique and fragile features important to the Central New York coastal zone;

(b) Promote the preservation of distinct, unique, and fragile physiographic features through the adoption, and enforcement of existing local land use controls.

4. Conservation of mineral resources

Policies:

(a) Regulate the use and removal of mineral resources;

(b) Promote the enforcement of land reclamation practices after resource exploitation.

5. Protection and conservation of important hydrologic phenomena

Policies:

(a) Promote protection of groundwater supplies through enforcement of local land use and health codes in acquifer and acquifer recharge areas;

(b) Promote development of a storm drainage design criteria and standards system to minimize increased runoff associated with land development;

(c) Promote the adoption of suitable flood plain ordinances in local communities to attain eligibility in the National Flood Insurance Program;

(d) Promote support for Central New York Areawide Water Quality Management Planning Program.

GOAL: The provision of opportunities for residents and visitors to use and enjoy amenities in the Central New York coastal zone.

OBJECTIVES: 1. Provision of opportunities for public access and public recreation in the coastal zone

Policies:

(a) Promote the establishment of coastal access points through public acquisition;

(b) Promote development of sufficient recreation areas through combination of state and local parks;

(c) Promote development of adequate supportive facilities for recreational facilities.

2. Preservation and enhancement of scenic views and vistas

Policies:

(a) Promote acquisition of land for scenic easements in areas where development would destroy high quality and unique coastal vistas

3. Preservation and enhancement of unique historic areas and areas of cultural significance

Policies:

(a) Promote public acquisition of historic structures and sites in the Central New York coastal zone.

GOAL: To promote the public welfare and economic well-being in the coastal zone

OBJECTIVES: 1. Promotion of orderly development, avoiding land use conflicts and unnecessary degradation of natural resources

Policies:

(a) Promote the adoption and enforcement of sound land use controls at the local level;

(b) Encourage the development of land use and supportive planning activities at the local level;

(c) Support the development of the comprehensive plan for the coastal zone being prepared by the St. Lawrence/Eastern Ontario Commission.

2. Provision for the planned development of environmentally sound statewide and regional infrastructure facilities such as ports, power generation and transmission facilities, and water-oriented commercial and industrial developments essential to the economic viability of the State and its coastal communities.

Policies:

(a) Promote participation in the NYS Upstate Port Study by communities affected;

(b) Encourage environmentally compatible development of necessary power-generation facilities projects.

3. Preservation and enhancement of economically viable agricultural and forest lands

Policies:

(a) Promote the creation of agricultural districts in accordance with the NYS Agricultural Districting Law;

(b) Promote the conservation and wise use of coastal forest resources.

GOAL: To develop and implement an effective management plan and program for the Central New York coastal zone

OBJECTIVES: 1. Coordination of State, regional, and local programs and projects

Policy:

(a) Develop and encourage interagency information exchange.

2. Identification of public needs and desires

Policy:

(a) Develop a Technical Advisory Committee comprised of lay individuals to provide an information and response mechanism to the coastal zone program.

3. Evaluation of existing local and State laws and regulations to determine their adequacy in meeting the above goals and objectives.

4. Indication of which existing local and State control mechanisms need to be upgraded, strengthened, or otherwise modified to achieve the above goals and objectives.

5. Assessment of local and State relationships in terms of the above goals and objectives to maximize the efficiency of each level of government in carrying out its appropriate regulatory and administrative roles.

6. Recommendation to establish new local or State administrative or regulatory functions to further implement the coastal zone management goals and objectives.

COASTAL ZONE BOUNDARY

CENTRAL NEW YORK COASTAL ZONE MANAGEMENT PROGRAM

PHASE I: TECHNICAL MEMO #2

AUGUST 1975

DISCUSSION OF CONSIDERATIONS AND LIST OF CRITERIA FOR DETERMINING THE COASTAL ZONE IN CENTRAL NEW YORK

CONSIDERATIONS

Guidelines for determining the Coastal Zone for purposes of the National and State Coastal Zone Management (CZM) Programs are set forth in the National CZM Act, and the Federal Register.

PL 92-583

PL 92-583 (the National CZM Act) defines in Section 304(a) the "Coastal Zone" as the coastal waters (including lands therein and thereunder) and adjacent shorelands (including waters therein and thereunder), strongly influenced by each other and in proximity to the shoreline, and includes transitional and intertidal areas, salt marshes, wetlands, and beaches. The zone extends seaward to the outer limit of the U. S. Territorial Sea. The zone extends inland from the shorelines only to the extent necessary to control the shorelands, the uses of which have a direct and significant impact on the coastal waters. (N.B. - federal and federally controlled lands are excluded from the coastal zone).

Section 304(b) defines "coastal waters" as the Great Lakes, their connecting waters, harbors, roadsteads, and estuary-type areas such as bays, shallows, and marshes.

FEDERAL REGISTER

Section 960.11 of 15 CFR 960 and Section 920.11 of 15 CFR 920 say that States may wish to make a distinction between (1) a planning area in order to study, plan and set policies for coastal resource use and management, and (2) a management area which would be the ultimate area identified as the Coastal Zone and in which specific land and water use controls, regulations, and active management activities will be applied. Demographic, economic, developmental, and biophysical factors will largely determine State management activities in coastal waters and the landward and seaward areas and the uses affecting them. Many of these factors, of course, are likely to be based upon data, programs, and institutional boundaries (RPB's and CPB's) that encompass areas larger than the coastal zone designation. Specific coastal zone programming and regulation must take into account current developmental, political, and administrative characteristics as well as the natural environmental and biophysical characteristics.

The Federal Register further states that the Coastal Zone for Management purposes extends only to the extent necessary to control shorelands the uses of which have a direct and significant

impact on the coastal waters. Other factors which should be considered are: energy policy, siting of power plants and other major water-dependent facilities, surface and subsurface mineral extraction, and overall land and water conservation policies.

BOUNDARIES

References cited above include suggestions for defining the actual boundary itself. These include:

(a) A man-made structure, such as a highway or railroad line.

(b) Geographic areas of particular concern.

(c) An arbitrary distance; e.g., one mile from the shoreline.

(d) Flood plain boundaries

(e) Political boundaries

(f) Hydrologic units, such as tributary drainage basins.

SUMMARY

It is apparent from the federal legislation and guidelines listed in the Federal Register that the Coastal Zone Management Program will treat areas much smaller than counties. It appears that this is coincidental rather than a policy in itself. The actual boundaries, of course, will be dependent upon the criteria used. The guideline for selection of criteria is a strict interpretation of the definitions supplied in legislation and the Federal Register, namely the coastal waters and adjacent shorelands, strongly influenced by each other and in proximity to the shoreline ... the zone extends from the shoreline only to the extent necessary to control the shorelands, the uses of which have a direct and significant impact on the coastal waters.

CRITERIA:

WATER SURFACES

1. Water surface, extending from the "shoreline" to the U. S. - Canadian Border. For study purposes, all water surface extending seaward 1,000 feet from the "shoreline".

2. "Coastal Waters", including but not limited to harbors, roadsteads, and estuary-type areas such as bays, shallows, and marshes.

3. Other waters, adjacent to the shoreline, which contain a measurable quantity of sea water, including but not limited to, sounds, bays, lagoons, ponds, and estuaries.

4. The mouths of streams whose water discharges into Lake Ontario and its coastal waters.

5. Streams, upstream to the extent that existing or potential land and water uses, located on or adjacent thereto, are related directly to the existence of Lake Ontario.

LAND SURFACES

6. Physiographic features whose existence or character is due directly to lake influences, including but not limited to, beaches, sea cliffs, and bars.

7. Flood hazard areas, including those areas included within the 100-year flood plain of the lake and tributary streams as described above in #5.

8. Areas within the Lake Plain, but limited to areas which meet one or more of the other criteria.

9. Areas which contain or have the potential to support a relatively high proportion of land uses related directly to the existence of Lake Ontario, including but not limited to:

   (a) Recreational uses, including swimming, boating, fishing, hunting, campgrounds, and so on;

   (b) Commercial activities, including marinas, retail boat sales, retail sports equipment sales, campgrounds, cabin and cottage rentals, land and water based tour and guide activities, and so on;

   (c) Agricultural activities dependent upon coastal and lake influences, or whose existence and location is due to characteristics of the Lake Plain;

   (d) Industrial uses and activities, including shipping, commercial harbors, water-dependent manufacture, commercial fishing, extractive industries, etc.;

   (e) Special natural ecosystems, unique natural areas, open space, and environmental phenomena whose character and existence is due to the unique land-water interface created by lake influences;

(f) Special public uses and activities, including fish hatcheries, wildlife management areas, forest and open space preserves, publicly managed recreation, and so on;

(g) Lake-dependent utilities, including power-generating plants; waste disposal areas, and so on;

(h) Seasonal and permanent residential areas whose existence and location is due to lake and coastal influences.

INTERPRETATION

For purposes of the Central New York Coastal Zone Management Program, an area may be recognized and designated as being within the "coastal zone" if one or more of the above considerations are evident in areas adjacent to the Lake Ontario shoreline. No one element should be construed as being more important than another. Rather, determination of a coastal zone for either planning or management program purposes must be dependent upon the characteristics of a particular tract or area of land; the lakeward, or open water, determination is an arbitrary 1000 feet from the shoreline.

Consideration of this discussion as a premise limits the potential coastal zone boundary to a relatively small area, running more or less parallel to the Lake Ontario shoreline. Three options are discussed briefly below; the map at the end of this memo depicts these graphically.

Option #1

This option is the most narrow of the three presented here. As the map shows, the boundary follows Rt. 3 in northern Oswego County around North and South Ponds to the Salmon River (Rt. 5), encompasses the Village of Pulaski, returns toward the lake along Rt. 13. It follows Rt. 3 again, then Rt. 104B and minor roads near the lake. The City of Oswego is encompassed and from that point follows Rt. 104A through Cayuga County. This boundary is a much stricter interpretation of the guidelines; coincidentally, it is almost exactly the same boundary which the St. Lawrence-Eastern Ontario Commission (SLEOC) uses as the inland limit of its "primary coastal zone", the area in which that agency performs detailed project reviews of development proposals.

This option more precisely delineates a boundary consistent with the Federal Register phraseology, ". . . coastal waters and adjacent shorelands, strongly influenced by each other and in proximity to the shoreline. . . the zone extends only to the extent necessary to control the shorelands, the uses of which have a direct and significant impact on the coastal waters. . ."

Specifically, Option 1 includes the boundary which is the most narrow. It is a "major roads boundary" type. It is somewhat inconsistent, as it must follow the Oswego City boundary in order to include the entire city. It was chosen as an option, because it includes all of the wetlands, unique vegetation and wildlife habitats, and other land forms directly influenced by coastal activity. It includes the City of Oswego and the villages of Pulaski and Fair Haven. Oswego is directly on the coast. Fair Haven is on Little Sodus Bay and is directly influenced by coastal activities. Pulaski is on the Salmon River which flows into Lake Ontario 2½ miles away. In addition, a Salmonid program and a habor at the mouth of the Salmon River is proposed which will make Pulaski's ties with Lake Ontario and coastal activities even stronger.

Option 1 begins at the Jefferson County line at Route 3. This route parallels the coastline at a distance of approximately one mile in from the coast. It is therefore a useful structure for identifying a boundary. At the Salmon River however, it is necessary to deviate from the major roads concept. The Salmon River is a large river which empties into Lake Ontario. The proposed Salmonid program and harbor of refuge on the Salmon River determine that the river be included as far as the village of Pulaski.

Convenient highways on either side of the river are used as boundaries. The boundary then returns to Route 3 along the coast, where it intersects with Route 104B. Since this route is approximately one mile from the coast, it retains continuity of the boundary. It shortly intersects with Route 1, at which point this becomes the boundary to retain continuity. At Route 29, however, the boundary turns south to Route 104. This is necessary in order to include development along Route 29 which may affect the coastal area. Route 104 is the coastal boundary until it reaches the Oswego City line. Since the entire City of Oswego affects and is part of the immediate coast, the city boundary is the Option 1 boundary until it meets Route 104 on the west side of the city. At that point, 104 and 104A is the coastal zone boundary as far as the village line of Fair Haven. Once again, these highways are approximately one mile in from the coast and provide continuity to the narrow boundary Option 1. The village of Fair Haven is a coastal village and its boundary is used from 104A to the Wayne County line.

Option #2

Option #2 essentially is the same as #1, the only difference being the inclusion of the Village of Altmar on the Salmon River and Mexico on the Little Salmon. The primary reason for this extension is to accommodate Water Surface criterion (5): streams, upstream to the extent that existing or potential land and water uses, located on or adjacent thereto, are related directly to the existence of Lake Ontario. In this instance, the Salmon and Little Salmon rivers support a growing sports fishing activity which is relatively major upstream of the two villages.

Option 2 is similar in many respects to Option 1, except that it includes the villages of Altmar and Mexico. The two villages show potential for further development as population increases as predicted by local, regional, and state studies.

The Option 2 boundary is the same as the Option 1 boundary as far as the village boundary, where it meets the Salmon River. At that point it follows Centerville Road to the village of Altmar. This road is a convenient boundary marker as it parallels the Salmon River at a distance of approximately 1000 feet, which is a criterion guideline from the Federal Register. The village boundary is used (since we wish to include the village of Altmar in Option 2) until it meets Route 13 on the south bank of the Salmon River. This route is convenient for the same reason that Centerville Road was chosen on the north side. Option 2 boundary then follows Option 1 until Route 3 intersects with 104B. At that point, Route 3 becomes the boundary Option 2, as it is a major road which flows to the village of Mexico, which we wish to include in Option 2. The village boundary is used for Option 2 for the same reason that the village boundary of Altmar was used. Then Route 16 was used on the west side of Mexico as the boundary, since it is a convenient road which returns to the coast. At the intersection of Route 16 and 104B, the Option 2 is the same as Option 1 to the Wayne County border.

Option #3

This option is an extension of the rationale behind options #1 and #2. Here, however, a major consideration is land surface criterion (9). Because of the anticipated growth of salmon sports fishing, it is anticipated that supportive facilities and related land uses will increase in number and consume larger amounts of land surface. To ensure that the Coastal Zone Management program is directed to this eventuality, the actual coastal zone will have to encompass a much larger area. Thus, option #3 extends the boundary eastward to Rt. I-81 in the northern part of Oswego County, and southward in the area adjacent to the Village of Mexico.

The largest area allows for maximum interpretation of the criteria for boundary selection. A large portion of the Town of Sandy Creek is included, which incorporates the Villages of Sandy Creek and Lacona. These villages may expect growth as they are on Route 81 and a viable Penn Central rail line. This growth, and the Route 81 exit on Route 15 leading to the shore may cause considerable influence on coastal activity.

Another large area included in Option #3 is an area in the Town of New Haven. This area north of Route 104 includes the Village of New Haven, and the route is a major transportation corridor for travel between Mexico and Oswego. Given this fact, we can expect development along this route, which will impact the surrounding tributaries which feed Catfish Creek and Butterfly Creek.

Option 3 begins at the Jefferson County border at Route 81. This major route is a convenient limited access highway which, when followed, creates a boundary which parallels the coastline for approximately ten miles. However, at the border of the villages of Sandy Creek and Lacona, the town borders are used as the Option 3 boundary, so that the two villages may be included.

Many tributaries to the Salmon River are found just north of boundary Option 2. Therefore, at the intersection of the village boundary of Pulaski, Canning Factory Road is followed until it intersects with Centerville Road. This makes it possible to include the land surface which contains the tributaries mentioned above. At Centerville Road, Option 3 is the same as Option 2 until the west side of the village of Mexico is reached.

Therefore, Route 104 was used in Option 3, as it is a convenient major road which parallels the coast, yet enables the inclusion of the above mentioned large area in the boundary Option 3.

Where Route 104 meets Route 29, the boundary Option 3 is the same as boundary Option 1 to the Wayne County border.

CONCLUSION

Any boundary selected for use in the Central New York Coastal Zone Management program must be in conformance with explicit state guidelines. Depending on interpretation, any one of the three discussed here could do so. The line will be adopted at the state level and will be used for planning and management purposes.

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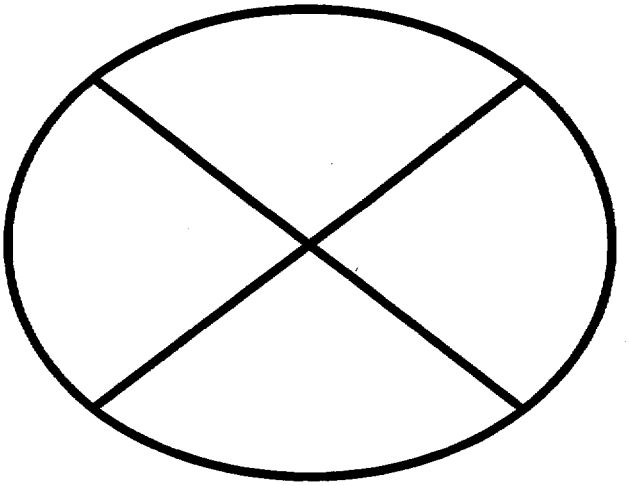

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COASTAL WETLANDS

CENTRAL NEW YORK COASTAL ZONE MANAGEMENT PROGRAM

PHASE I: TECHNICAL MEMO # 3

AUGUST 1975

I INTRODUCTION

Wetlands are lands submerged by shallow water all or most of the year, supporting distinct plant and animal life. Wetlands can take several forms, but in general terms include swamps (primarily supporting shrubs and trees), marshes (primarily supporting grassy plants), and bogs (wetlands having stagnant or nearly stagnant water in which decaying vegetation accumulates, gradually filling in the bog while a series of plant types grows on the thickening sediments).

Purpose of Study

Wetlands are important resources enjoyed by many residents of and visitors to New York State for aesthetic, recreational, scientific, educational, and economic purposes. But wetlands are highly vulnerable to encroachment and damage. Potentially, most wetlands can be drained, filled, dyked, dredged, or converted to other types of land and water uses. These shallow water areas are essential converters in the aquatic ecosystem and their retention, therefore, is basic to sustaining waterfowl and other life forms dependent upon this type of environment. Accordingly, the New York State Freshwater Wetlands Act was passed in an effort to protect the State's Wetland resources.

An important component of the Central New York Coastal Zone Management Program is the identification of potential conflicts between existing and possible future land and water uses, and the existence and characteristics of natural features. Analysis of the significance of these resources to the coastal zone and their relationship to state, regional, and local objectives will provide the basis for future designation of priorities. In this way, the coastal zone management program will enable residents to decide what uses of natural resources should be permitted or prohibited. This report, therefore, deals with one of several important natural resources in the study area -- coastal wetlands.

Scope of Study and Study Area

The inventory area includes all major wetlands situated along the southeast shoreline of Lake Ontario in Cayuga and Oswego Counties (see map at end of report). These coastal wetlands range in size from 24 acres to 1200 acres, varying in depth and cover-type patterns depending on individual site and water level characteristics.

No attempt has been made to "re-inventory" the coastal wetlands. Rather, this report relies primarily on the following previously published documents:

CNY RPDB -- Forests and Wetlands, November 1970

NYS Department of Environmental Conservation -- Wetlands of Eastern Lake Ontario and the St. Lawrence River, December 1969

Oswego County Planning Board -- Wetlands of Oswego County, New York: An Inventory and Analysis, May 1973

U.S. Department of Interior — Wetlands of New York, July 1959

This report documents known characteristics about each wetland and includes information about hydrologic aspects, wildlife, vulnerability to destruction, agriculture potential, and ownership, in addition to identifying wetland type. Following the inventory is a brief analysis of wetlands' characteristics, particularly their value as a natural resource.

II GENERAL WETLANDS CHARACTERISTICS

Origin and Creation of Wetlands

Central New York coastal wetlands occupy the remnants of an ancient lake basin that existed some 10,000 years ago. Named Lake Iroquois, the basin encompassed an area which included Lake Ontario, Oneida Lake, and Cayuga Lake. The lake was dammed at its north end by glacial ice sheets and originally drained eastward through the Mohawk Valley to the Hudson River system. Meeting glaciers increased the lake's surface area. As the glaciers receded, large deposits of earth and rock, or till, were left and molded into elongated hills, or drumlins.

As the glaciers retreated, large blocks of ice broke off and remained buried in drift deposits. As these ice blocks melted, lakes were formed whose basins consisted of the compacted drift material. This process accounted for the formation of many Central New York lakes.

Lake Iroquois underwent natural eutrophication, resulting in lacustrine deposits. The Central New York coastal zone contains an abundance of soils formed in these deposits, many of which underlie today's wetlands. Further eutrophication of Lake Iroquois resulted in existing relief features. Wetlands remain to delineate the basin and coastal embayments of ancient Lake Iroquois.

Flora and Fauna

Wetlands are a highly vulnerable natural resource. They generally contain a higher proportion of living matter than comparable terrestrial and aquatic habitats. Wetlands being a transitional zone between land and surface water, they are used by creatures of both land and water environments (including humans). Due to the delicate balance of the wetland ecosystem, it can be easily disrupted or destroyed by human encroachment on or near the wetland.

An abundant animal community exploits wetland resources either as full time inhabitants or as visitors from nearby lakes and forests. The great blue heron, blue winged teal, mallard, wood duck, and several species of songbirds are readily found in Central New York's coastal wetlands. White-tailed deer, raccoon, opossum, skunk, muskrat, beaver, and red fox utilize wetland vegetation as a major food source. Numerous snapping and painted turtles, spotted newts, frogs, and tree peepers live out their life cycles in the wetland environment. Bog turtles, considered an endangered species by the New York State Department of Environmental Conservation, are occasionally found in coastal wetlands. In addition, many game animals of upland environments frequently utilize and depend upon wetland complexes for food and cover.

A diverse plant community abounds in coastal wetlands. Arrow arum, bubush, burreed, cattails, loosestrife, pondweed, sedges, and skunk cabbage are common. Natural wetland succession results in eventual development of hardwood swamps. In some areas in the coastal zone, red maple stands are major resources, along with willow, hemlock, ash, and white cedar. Many plants in this area are generally considered to be rare or endangered.

Relationship of Wetlands to Groundwater

Detailed information about the relationship between Central New York coastal wetlands and groundwater is lacking. However, scientists know that wetlands are at least potentially major recharge areas for underground water supplies. Recent research performed by the staff of the Water Resources Research Center at the University of Massachusetts indicates that wetlands are an integral part of the hydrologic system and constitute reservoirs in both surface and subsurface water flows. The following discussion is based upon the research conducted by Motts and Heeley for the Office of Water Resources Research, U.S. Department of the Interior.

Groundwater is defined as water which penetrates the earth's surface from precipitation and from infiltration by streams, ponds, and lakes. Entry, storage, and movement of groundwater are influenced by several factors including the characteristics of soils and rocks as well as topography, landscape, and surface drainage.

Wetlands are classified into five basic categories based on underlying deposits: till and bedrock, stratified drift, alluvium, lake bottom, and other deposits. These categories determine the nature of groundwater occurrence. Stratified-drift wetlands include wetlands on outwash, ice-contact deposits, glacial lake deltas, and other permeable deposits of glacio-fluvial origin. Wetlands on other deposits include those on post-glacial sand spits, sand dunes, and marine and estuarine deposits. Each kind of wetland receives, stores, and transmits water in a very different way.

Till is the geologic term for material that was deposited directly by glacial ice during the ice age; bedrock or "ledge" is the term for hard, compact crystalline and stratified rocks which form the foundation of the landscape. Groundwater in bedrock-till wetlands occurs in a "perched" condition above the poorly permeable bedrock and till. These wetlands are underlain by relatively small amounts of water and for the most part owe their wet condition to periodic flooding and back overflow. Thus, bedrock-till wetlands are the least permanent of all, i.e., they can easily lose their "wet" character in the arid portion of climatic cycles. These wetlands do not contain enough water to supply towns or industries, but they may contain enough water for adequate domestic supplies.

Stratified drift (including outwash and associated deposits) and alluvium were laid down by surface streams and rivers. Alluvium was deposited by recent streams, and stratified drift was deposited by streams flowing on or from glacial ice. Stratified drift was well sorted by running water, and the fine-grained silt and clay were carried downstream or flushed away. Consequently, stratified drift has high porosity and a great capacity to hold and transmit groundwater.

In stratified-drift wetlands and alluvial wetlands, groundwater occurs in deposits of silt, sand, and gravel under water table conditions, i.e., water will neither rise nor lower in a test well drilled through the saturated zone. Some wetland-associated deposits that are very thick have the capacity to yield large quantities of water to wells. Because most stratified-drift wetlands and some alluvial wetlands are underlain by large quantities of water in storage and transit, they are more "permanent" than bedrock-till wetlands, i.e., they tend to keep their wet character through changes of climate or stream regime.

As water from the melting glaciers deposited its burden of sand and gravel, fine grains of silt and clay commonly stayed suspended in the melt water until the water entered ancient glacial lakes. At one time these lakes were numerous and included large areas in the Northeast where silt and clay slowly settled out to form fine-grained lake-bottom deposits. Most of these lakes drained and dried up when their outlet streams eroded through dams of glacial debris or where the retreat of the glacier resulted in water flowing away from the lake.

Two hydrogeologically different types of wetlands occur on these lake beds of fine-grained silt. As in bedrock-till wetlands, some lake-bed wetlands are characterized by a shallow "perched" water zone fed by flooding surface streams; consequently, these wetlands are less permanent. The second type is the most permanent of all wetlands because it is characterized by a deep zone of artesian water below the semi-confining lake beds. The source of the artesian water zone is commonly from a large surrounding area and therefore affected to a minor degree by changes in climate or local stream flow. The deeper zone of artesian water is usually under pressure and consequently the water slowly percolates upward through the clays to form a shallow perched water zone on top of the clays. This steady recharge from the deeper zone keeps the wetland in a constant "wet" condition. This shallow perched water condition may also occur in wind-blown sands or other shallow unconsolidated sediments.

The following criteria are useful for evaluating the adequacy of wetlands for groundwater supply <u>if the geology of the wetland area is known</u> and <u>if test wells have been drilled into the wetland and test-pumped</u>.

<u>Transmissivity</u>:	the ability of a water-bearing formation or aquifer to transmit water to wells.
<u>Storage</u>:	the amount of water in storage and available for pumping.
<u>Quality</u>:	quality of groundwater underlying wetlands (chemical and biological quality must meet public health standards).

In lieu of test drilling and other detailed information to accurately determine these criteria, an indirect and very rough estimate of groundwater supplies in wetlands can be made using two criteria:

1. Measurements of base flow of streams flowing out of wetlands. If the stream or streams leaving the wetland have a much greater flow than when entering, there is probably considerable groundwater movement and storage beneath the wetland.

2. Examination of surficial geology from published maps or unpublished geologic information in state and federal files is a rough index of the productivity of aquifers underlying wetlands. The highest yielding aquifers occur in permeable deposits of sand and gravel such as glacial outwash plains, ice-contact deposits, and coarse alluvium. Some of the aquifers, however, may be buried beneath impermeable layers such as silt and clay of glacial lake beds, and a trained geologist should help in using maps.

Hydrogeologic studies indicate that wetlands are a valuable potential source of groundwater. Productive groundwater supplies underlie many wetlands. The actual percentage of wetlands underlain by such supplies can be determined only after field studies, but the Massachusetts Study indicates that it is approximately 40-50 per cent. At a time when increasing stresses from population and attendant urban and industrial development is causing more water demands, the groundwater occurrence in wetlands is relatively unrecognized. Improper development threatens to seriously impair groundwater resources. For example, the improper placing of landfills can cause deterioration in quality of wetland aquifers. Unrestricted urban development can occur over critical aquifer areas, preventing rain and snow-melt from recharging groundwater storage.

Wetlands are an integral part of the hydrologic system. The low, flat surfaces of wetlands gather runoff from adjacent hills and allow the water levels to build up and slowly release water to streams, reducing peak flood flows. After wetlands are flooded, they may recharge water-bearing formations or aquifers for several weeks. For an even longer period, wetland water storage augments the low-flows of streams.

Wetlands also discharge considerable amounts of water through evaporation from pools of standing water, from soil moisture, and through evapo-transpiration of water by plants. Whereas recharge of water is intermittent, this discharge is continuous. Greatest discharge occurs during the summer months in the growing season. The total amount of water discharged during the year is roughly equal to the amount of recharge (under a constant precipitation regime). However, the timing and manner of discharge can vary, particularly if people alter the system. Wells, for example, can cause a greater artificial discharge of water and can reduce natural discharge. Many wetlands are groundwater discharge areas where people can carefully and successfully compete with nature for their share of the discharge. However, people must not overdevelop the groundwater supplies by pumping more than the safe yield of the aquifer. The safe yield is that amount of water that can be pumped without depleting the aquifer or without impairing the water quality of the aquifer. Also, overpumping should be avoided so that water levels are not lowered to a depth so that wetlands "dry up" or lose characteristics that make them desirable for wildlife and visual and cultural reasons. These limits can only be determined by careful field geologic studies.

III WETLANDS INVENTORY

Wetland Classification System

A wetland may be classified as one of several types, depending upon its characteristics as defined by the U.S. Fish and Wildlife Service. Wetlands found in the CNY coastal zone fall into onE of the following categories:

Type 2 - Inland fresh meadows -- The soil usually is without standing water during most of the growing season but is waterlogged within at least a few inches of its surface. Vegetation includes grasses, sedges, rushes, and various broad-leafed plants. Representative plants are carex, rushes, redtop, reedgrasses, mannagrasses, prairie, cordgrass, and mints. Meadows may fill shallow lake basins, sloughs, or farmland sags, or may border shallow marshes on the landward side.

Type 3 - Inland shallow fresh marshes -- the soil is usually waterlogged during the growing season; often it is covered with as much as six inches or more of water. Vegetation includes grasses, bulrushes, spikerushes and various other marsh plants such as cattails, arrowheads, pickerelweed, and smartweeds. Common representatives in the north are reed, whitetop, rice-cut grass, carex, and giant burreed. These marshes may nearly fill shallow lake basins or sloughs, or they may border deep marshes on the landward side. They are also common as seep areas on irrigated lands.

Type 4 - Inland deep fresh marshes -- the soil is covered with six inches to three feet or more of water during the growing season. Vegetation includes cattails, reeds, bulrushes, spikerushes, and wildrice. In open areas pondweeds, naiads, coontail, water milfoils, waterweeds, duckweeds, water lilies, or spatterdocks may occur. These deep marshes may almost completely fill shallow lake basins, potholes, limestone sinks, and sloughs, or they may border open water in such depressions.

Type 5 - Inland open fresh water -- Shallow ponds and reservoirs are included in this type. Water is usually less than 10 feet deep and is fringed by a border of emergent vegetation. Vegetation (mainly at water depths of less than 6 feet) includes pondweeds, naiads, wildcelery, coontail, water milfoils, mushgrasses, water lilies, and spatterdocks.

Type 6 - Shrub swamps - The soil is usually waterlogged during the growing season, and is often covered with as much as six inches of water. Vegetation includes alders, willows, buttonbush, dogwoods, and swampprivet. Shrub swamps occur mostly along sluggish streams and occasionally on flood plains.

Type 7 - Wooded swamps - The soil is waterlogged to within at least a few inches of its surface during the growing season, and is often covered with as much as one foot of water. Wooded swamps occur mostly along sluggish streams, on flood plains, on flat uplands, and in very shallow lake basins. In the North, trees include tamarack, arborvitae, black spruce, balsam, red maple, and black ash. Northern evergreen swamps usually have a thick ground covering of mosses. Deciduous swamps frequently support beds of duckweeds, smartweeds, and other herbs.

Wildlife Value

Wildlife rating value is based on the type of cover available from the various wetland types. These value classifications reflect current fish and wildlife importance ratings assigned by regional fish and wildlife personnel of the New York State Department of Environmental Conservation according to the following rating criteria:

High - Habitat constituting the best of the State's wetland habitat reflecting the highest levels of fish and wildlife use and production.

Medium - Habitat of significant fish and wildlife use and production.

Low - Habitat receiving relatively low fish and wildlife use and production but may be important locally as a wildlife recreation area. (Areas rated in this category are often so designated because of competing interests involved that have an influence on fish and wildlife values; e.g. cottage developments.)

Vulnerability

Vulnerability ratings for each wetland unit are based on a combination of DEC and Oswego County Planning Board ratings. The vulnerability of wetlands to destruction by reason of filling, ownership, access, or intrusion of development either for agriculture or of urban type uses such as seasonal residences, has been determined from the scrutiny of the General Land Uses as determined by the Land Use and Natural Resource Study (LUNR) of the State and field surveys of land uses undertaken by county planning boards.

Accessibility in terms of the kind of roads available in the area were also considered in this latter capacity. The DEC ratings reflect current situations existing on individual wetland units as appraised by regional fish and wildlife personnel.

High - Active degradation of area presently occurring at a fast rate including fill, dredging, drainage, high degree of human presence and activity and a high degree of accessibility. Chances of complete degradation for fish and wildlife use is imminent, and is in immediate danger of being destroyed within the next five years.

Medium - Degradation of area is actively occurring at a slow pace, or the potential for very active damage is real because of increased accessibility, drainage, fill or human interests not compatible with the natural area. These units could be destroyed in the foreseeable future.

Low - Degradation very low or non-existent. Accessibility difficult and human activities generally compatible with nature of area. These areas are safe from destruction because of ownership, isolation, or other factors.

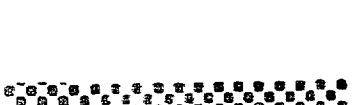
Cover Type Symbol Key

OPEN MARSH

WOODED UPLAND

FLOODED WOODS

OPEN WATERS

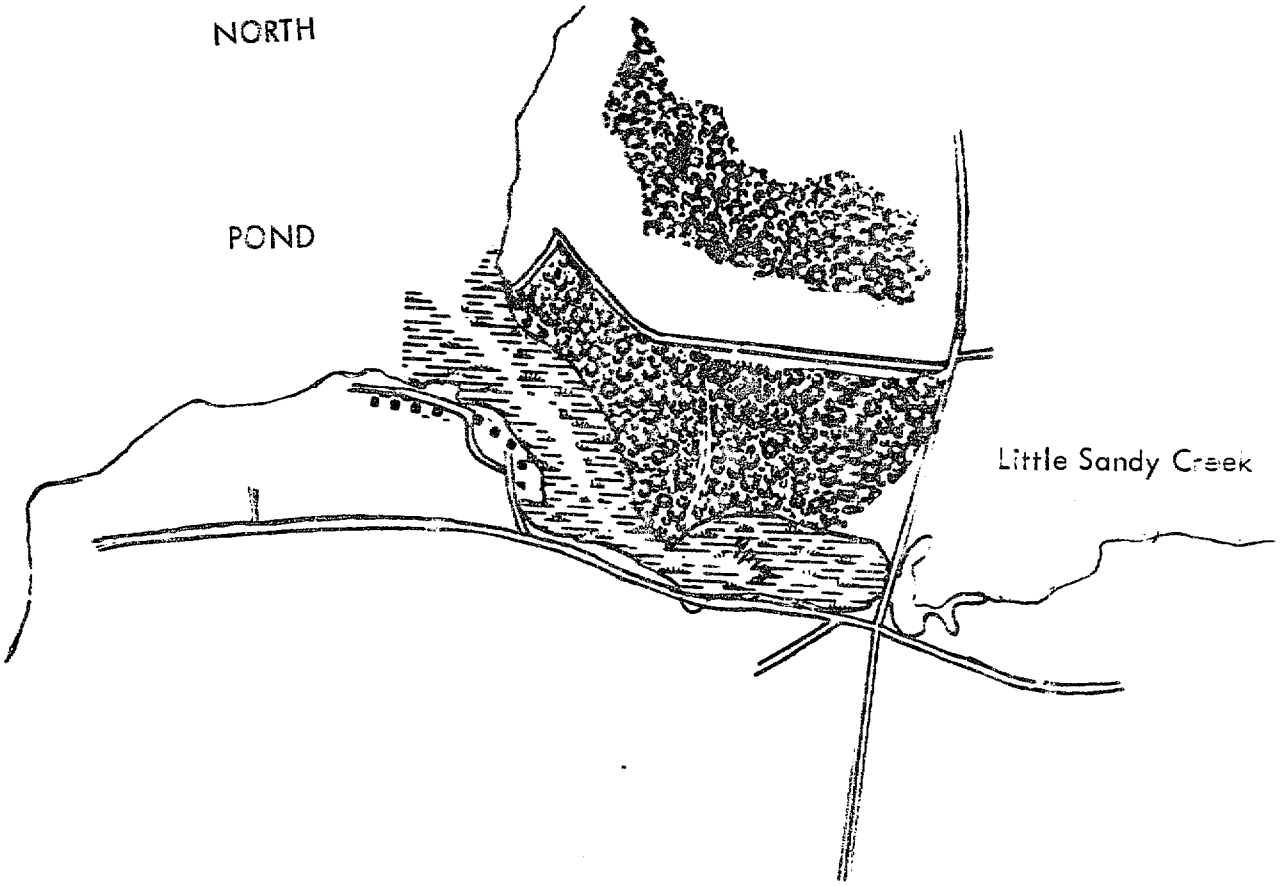


COTTAGE DEVELOPMENTS

1. NORTH SANDY POND MARSH

LOCATION:	Southeast side of North Pond, Town of Sandy Creek, Oswego County.
ACREAGE:	90 acres
WETLAND TYPE:	3 -- Inland shallow fresh marshes 60% 4 -- Inland deep fresh marshes 25% 5 -- Inland open fresh water 15%
GENERAL CHARACTERISTICS:	This unit's bedrock strata consist of Ordovician shales underlying sand and siltstone. Over this are soil layers characteristic of glaciation: drift and till deposits left by receding ice sheets. Lacustrine deposits (from the time of Lake Iroquois) underly more recent peat deposits. The layers have variable depths.
HYDROLOGIC CHARACTERISTICS:	Drainage is poor due to the nature of soils in this area and low relief. Water is often stagnant. Level fluctuates with level of Lake Ontario.
WILDLIFE VALUE:	Generally low, although sportsmen exploit the excellent fishing potential in summer and winter, and there is considerable waterfowl hunting. Four cattail areas provide good areas for nesting marsh birds, including Black tern, rails, Common gallinules, bitterns, long- and short-billed marsh wrens, and ducks (Mallard, Black, Blue-winged teal).
VULNERABILITY:	High vulnerability
AGRICULTURAL POTENTIAL:	Low
OWNERSHIP:	Private
COMMENTS:	Cottage development along the south margin of the wetland places additional pressure on wildlife habitats. In addition, many of these structures are located in flood hazard areas adjacent to the pond, whose level is controlled by Lake Ontario. Marine development has hindered wildlife breeding potential, and at present there is little chance of recovery to natural state.

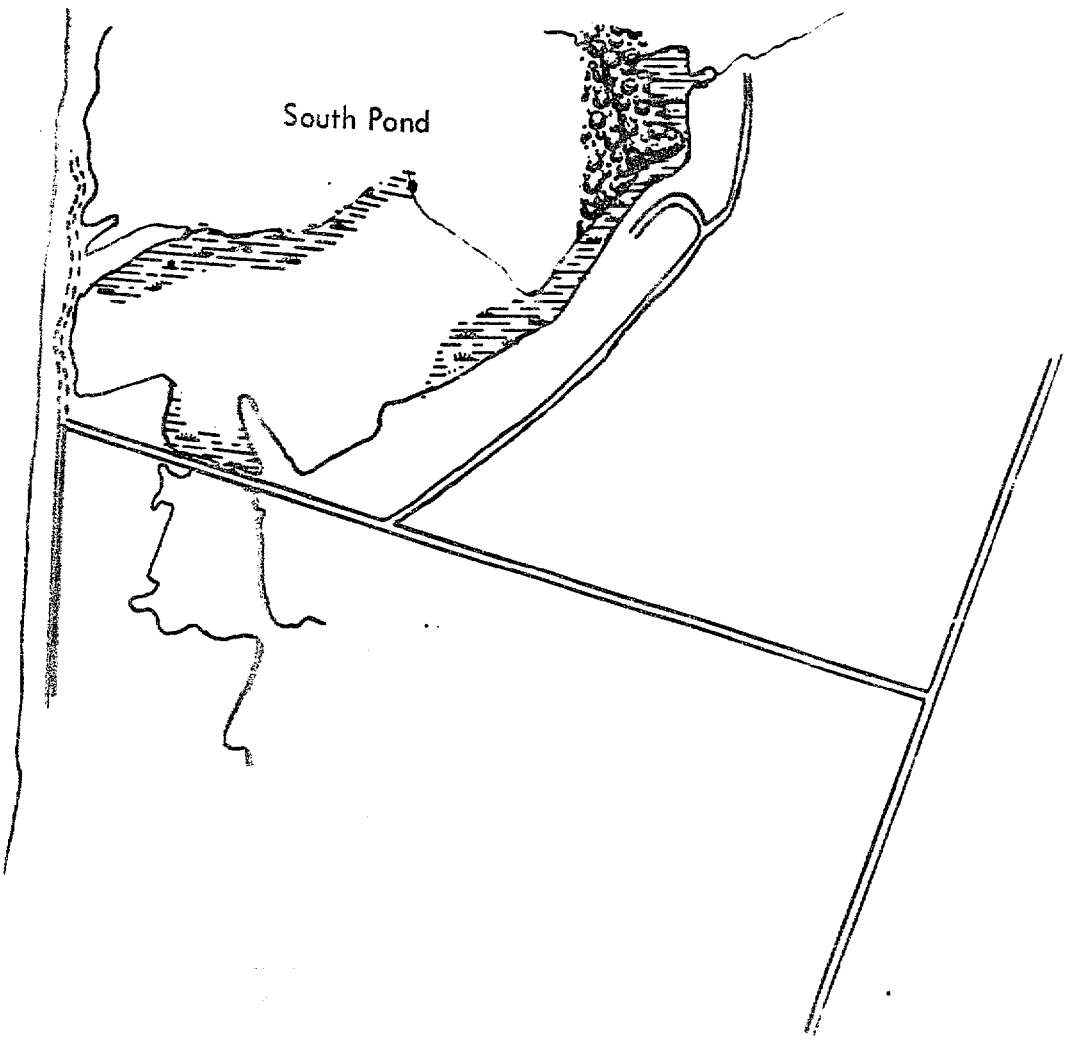
NORTH SANDY POND MARSH



2. SOUTH SANDY POND MARSH

LOCATION:	Between Rainbow Shores Drive and South Pond. Town of Sandy Creek, Oswego County.
ACREAGE:	110 acres
WETLAND TYPE:	3 -- Inland shallow fresh marshes 50% 4 -- Inland deep fresh marshes 10% 5 -- Inland open fresh water 10% 6 -- Shrub swamps 30%
GENERAL CHARACTERISTICS:	This unit has a peat bottom overlying soil formed in glacial till. It is deep, well to moderately drained, medium textured; topography can be described as undulating and sloping.
HYDROLOGIC CHARACTERISTICS:	Drainage is moderately good; it is better than in North Sandy Pond Marsh due to better soil drainage characteristics and increased gradient.
WILDLIFE VALUE:	Moderate
VULNERABILITY:	Moderate
AGRICULTURAL POTENTIAL:	Low
OWNERSHIP:	Private
COMMENTS:	Extensive cottage development has significantly reduced water fowl breeding potential and fishing for warm water species is limited. Very heavy public use.

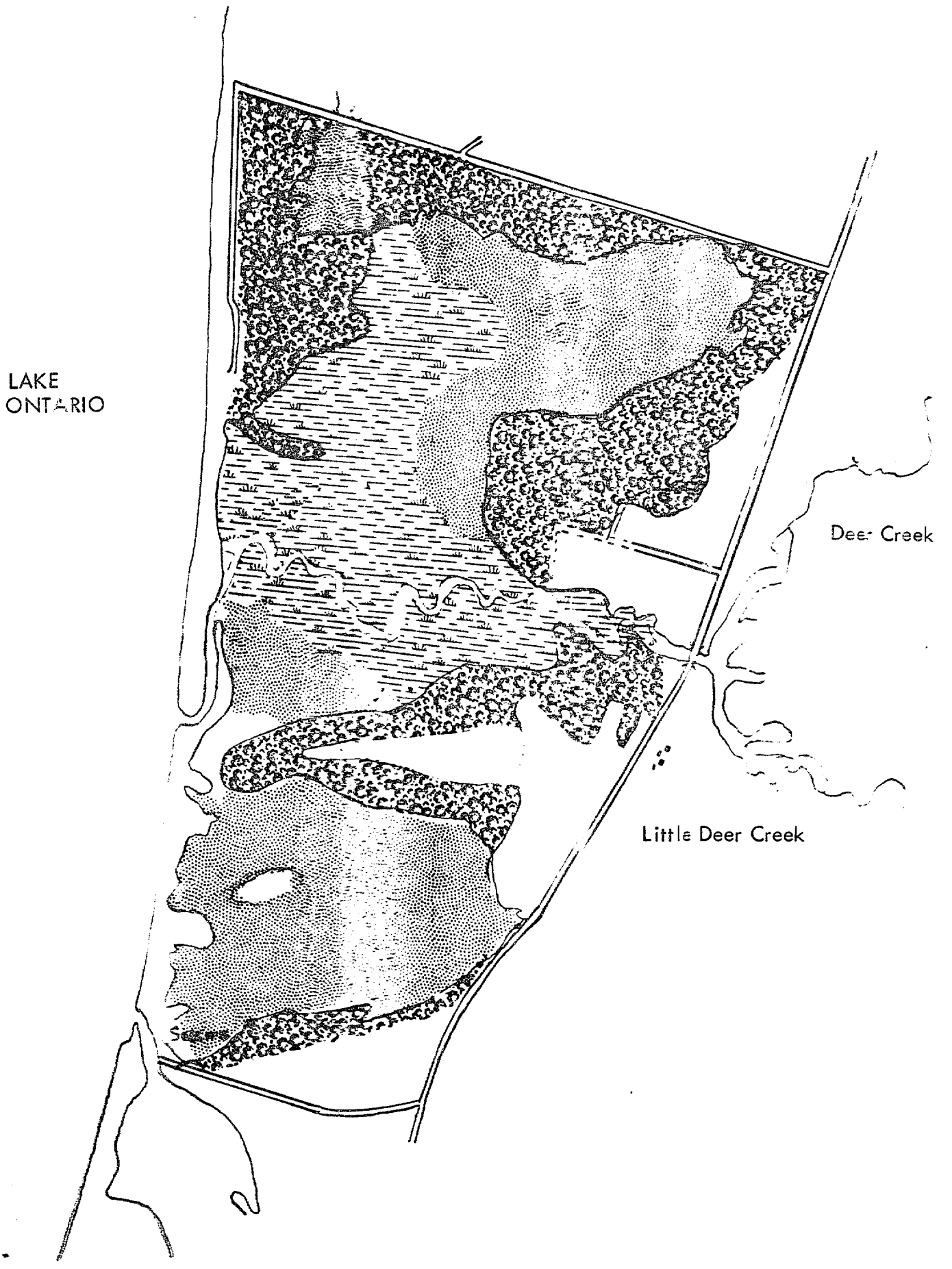
SOUTH SANDY POND MARSH



3. DEER CREEK MARSH

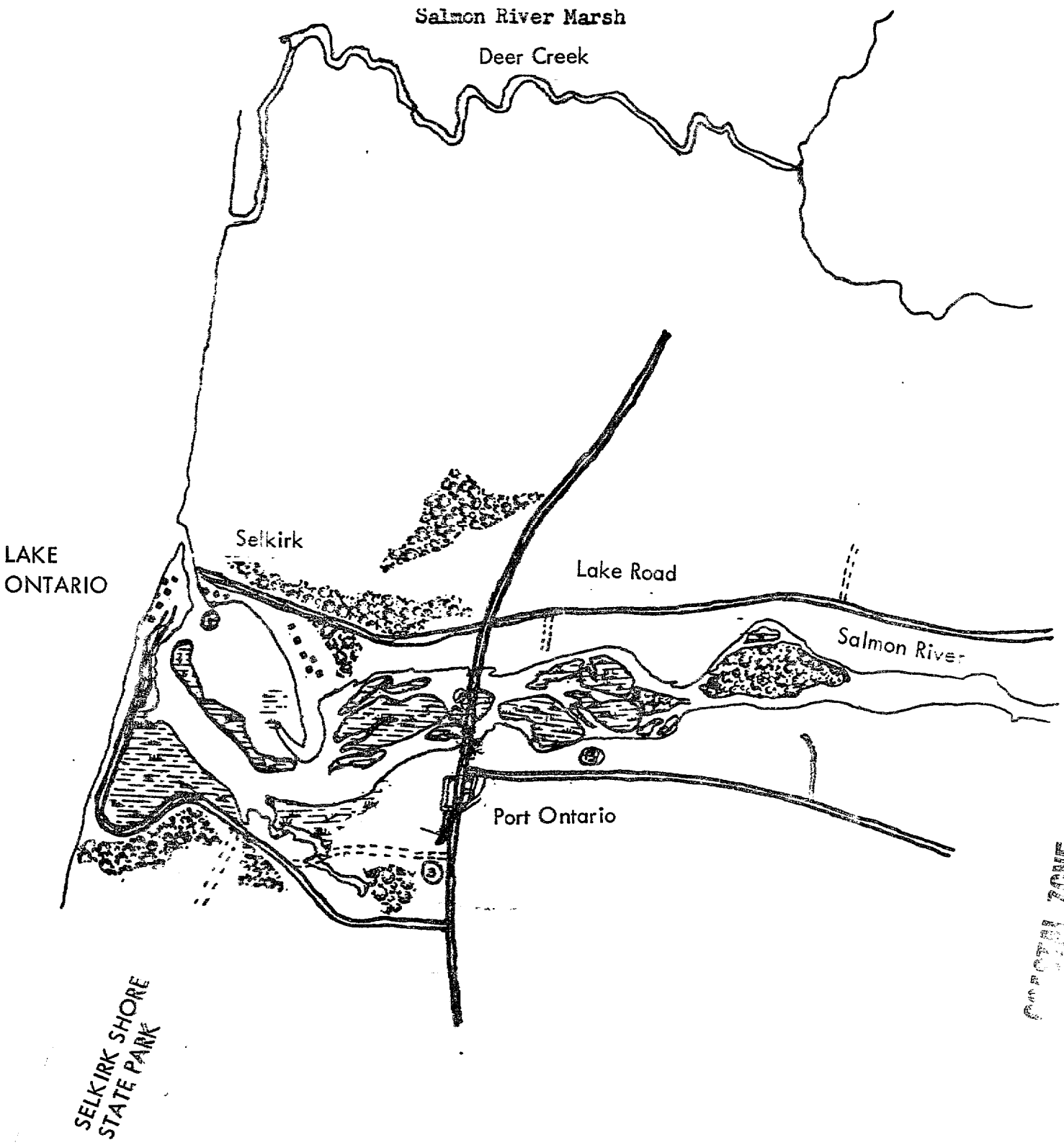
LOCATION:	Mouth of Deer Creek, south of Rainbow Shores Drive, Town of Richland, Oswego County.
ACREAGE:	1200 acres
WETLAND TYPE:	3 -- Inland shallow fresh marshes 35% 4 -- Inland deep fresh marshes 5% 5 -- Shrub swamps 30% 6 -- Wooded swamps 30%
GENERAL CHARACTERISTICS:	Underlying strata and soil type are similar to other coastal wetlands. Deer Creek Marsh is a very large wetland complex and at present is relatively undisturbed.
HYDROLOGIC CHARACTERISTICS:	Soils and land gradient contribute to well to moderately drained nature of unit. Water level controlled by Lake Ontario.
WILDLIFE VALUE:	High due to excellent fish and wildlife habitat in relatively undisturbed condition.
VULNERABILITY:	High
AGRICULTURAL POTENTIAL:	Low
OWNERSHIP:	Private
COMMENTS:	Excellent waterfowl breeding potential, fishing, and relatively undisturbed wildlife habitat make this unit very valuable. A large portion of the area is leased for duck hunting by the Mad River Club. Water levels are controlled by Lake Ontario, and the already excellent waterfowl potential could be enhanced further with stabilization of Lake Ontario water levels. This wetland has been designated as "extremely important" by DEC. However, private efforts are underway to develop areas for recreational and residential uses. Such encroachment could severely disturb or destroy the wetland.

DEER CREEK MARSH



4. SALMON RIVER MARSH

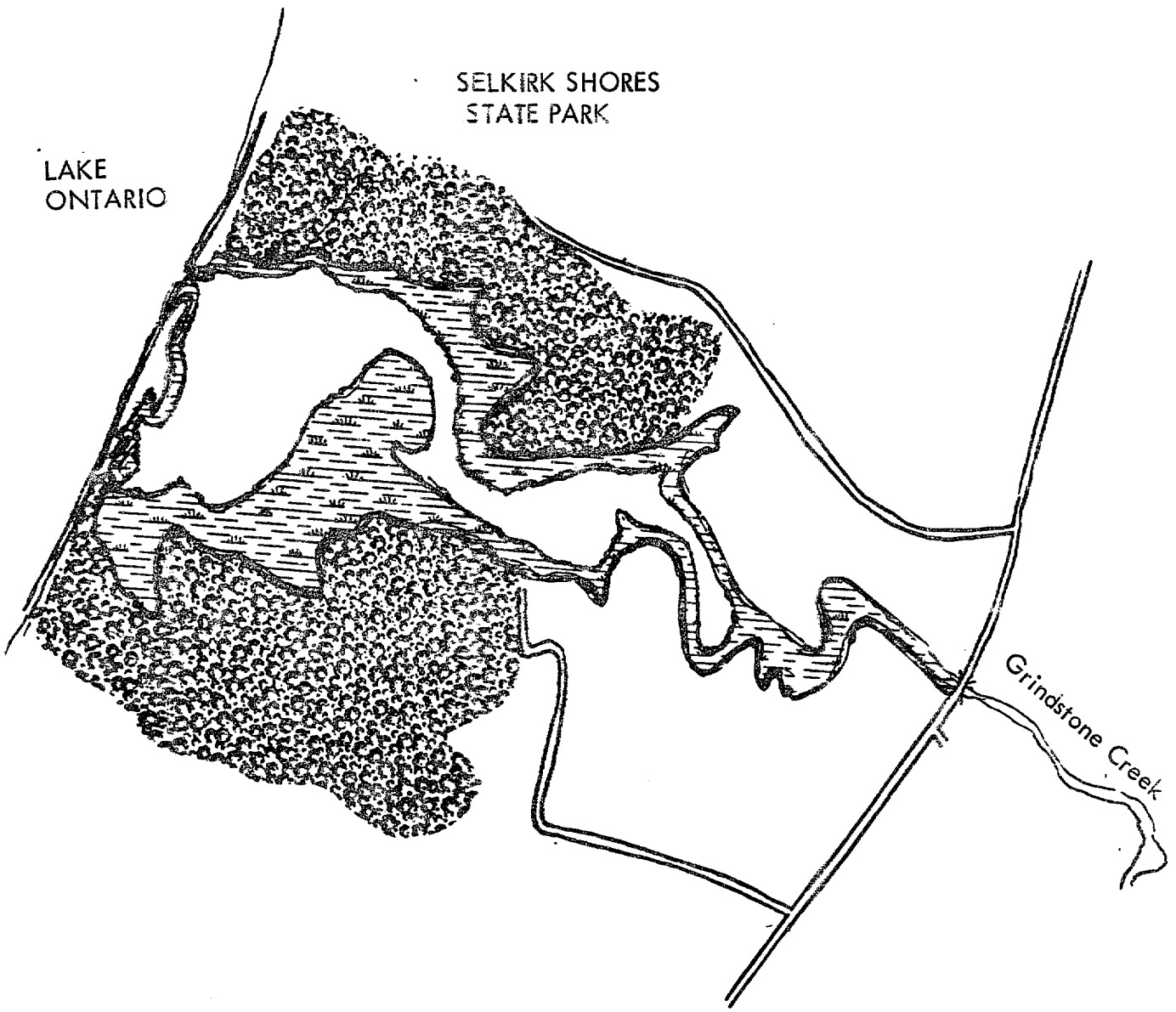
LOCATION:	Near mouth of Salmon River, Town of Richland, Oswego County.
ACREAGE:	320 acres
WETLAND TYPE:	3 -- Inland shallow fresh marshes 20% 4 -- Inland deep fresh marshes 30% 5 -- Inland open fresh water 50%
GENERAL CHARACTERISTICS:	Genuine wetland areas are scattered throughout wider mouth area of the Salmon River.
HYDROLOGIC CHARACTERISTICS:	Good to excellent drainage due to location within river. Large volume of water with good turnover.
WILDLIFE VALUE:	Low to moderate wildlife value. High fish population especially in upper reaches of wetland. This area is becoming important for Coho Salmon program and is perhaps the most important black tern nesting area.
VULNERABILITY:	Extremely high
AGRICULTURAL POTENTIAL:	Low
OWNERSHIP:	State and private
COMMENTS:	Easy access and recreational value of unit have promoted development around the wetland. Limited waterfowl used because of heavy human activity. Unless it is controlled this area will experience increased development as the salmonid program expands.


Salmon River Marsh
Deer Creek
LAKE
ONTARIO
Selkirk
Lake Road
Salmon River
Port Ontario
SELKIRK SHORE
STATE PARK

5. GRINDSTONE CREEK MARSH

LOCATION:	Mouth of Grindstone Creek, Town of Richland, Oswego County (south of Selkirk Shores State Park).
ACREAGE:	131 acres
WETLAND TYPE:	3 -- Inland shallow fresh marshes 70% 4 -- Inland deep fresh marshes 15% 5 -- Inland open fresh water 5% 6 -- Shrub swamps 10%
GENERAL CHARACTERISTICS:	Large cattail marsh, relatively undisturbed. Excellent interspersion of cover types during periods of high water.
HYDROLOGIC CHARACTERISTICS:	Slow flowing, low gradient. Poorly drained soils. Low runoff.
WILDLIFE VALUE:	High. Important production unit for waterfowl species including wood ducks and black ducks. Excellent habitat for muskrat and warm water fish species. Black tern nesting area.
VULNERABILITY:	Moderate
AGRICULTURAL POTENTIAL:	Low
OWNERSHIP:	State and private
COMMENTS:	Used extensively for hunting, fishing, and trapping. Located on soils which are poorly drained; unsuitable for development. This wetland has been designated as "extremely important" by DEC.

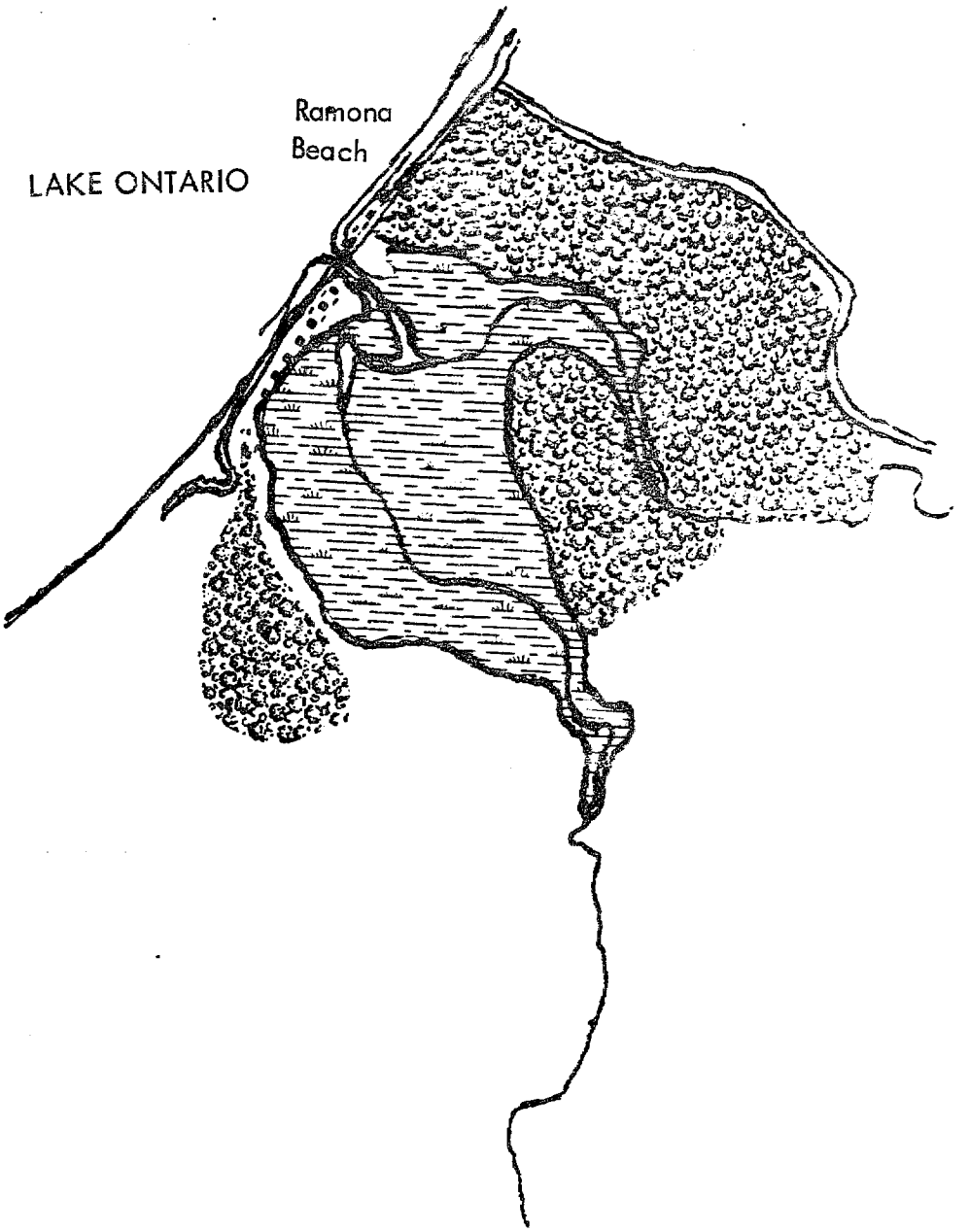
GRINDSTONE CREEK MARSH



6. RAMONA BEACH MARSH

LOCATION:	Mouth of Snake Creek, Town of Richland, Oswego County.
ACREAGE:	68 acres
WETLAND TYPE:	3 -- Inland shallow fresh marshes 75% 4 -- Inland deep fresh marshes 10% 5 -- Inland open fresh water 5% 6 -- Shrub swamps 10%
GENERAL CHARACTERISTICS:	Ramona Beach Marsh is exploited extensively by both man and wildlife. Open channel provides fish with access to spawning and feeding grounds. Surrounding soils are of glacial lake (lacustrine deposition) origin.
HYDROLOGIC CHARACTERISTICS:	Low gradient, poorly drained soils, slow flow. Level of marsh largely controlled by level of Lake Ontario.
WILDLIFE VALUE:	High. Large variety of dabbling ducks present during lake Ontario high water levels. Teal, woodducks, black ducks, and mallards are common. Potential for increased population of fur-bearing animals. Several species of fish present.
VULNERABILITY:	High
AGRICULTURAL POTENTIAL:	Low
OWNERSHIP:	Private
COMMENTS:	Barrier beach completely developed with cottages. The remaining portion of marsh is relatively undisturbed. There is good hunting and fishing; water level control could improve wildlife productivity. This marsh has been designated as "important" by NYS DEC.

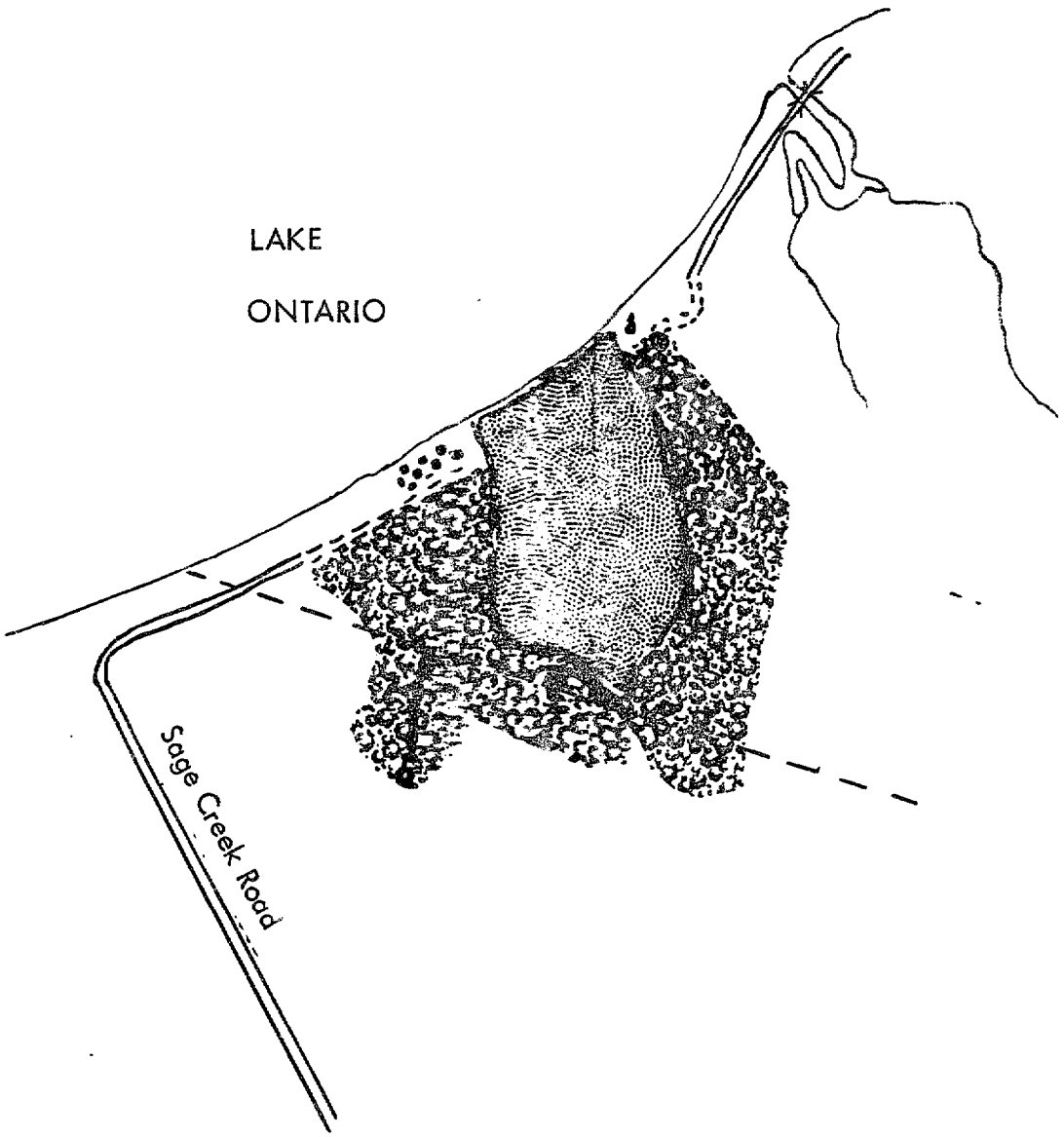
RAMONA BEACH MARSH



7. SAGE CREEK MARSH EAST

LOCATION:	Southwest Richland, Oswego County.
ACREAGE:	46 acres
WETLAND TYPE:	6 -- Shrub swamps 70% 7 -- Wooded swamp 30%
GENERAL CHARACTERISTICS:	This is a brushy marsh, enclosed by a barrier beach. The predominate species of brush growing in the wetland is buttonbush.
HYDROLOGIC CHARACTERISTICS:	Water leaves the marsh through the barrier beach by underground seepage. Marsh receives water from subsurface reservoirs, and has a high water table adjacent to it.
WILDLIFE VALUE:	Limited except as wood duck nesting area.
VULNERABILITY:	High
AGRICULTURAL POTENTIAL:	Low
OWNERSHIP:	Private and state
COMMENTS:	This unit has evidence of some wood duck production. There has been little human disturbance of the area, although there is cottage development on the barrier beach. Hunting is relatively poor because of limited access to the heavily vegetated interior marsh. This has been designated an "important area" by DEC.

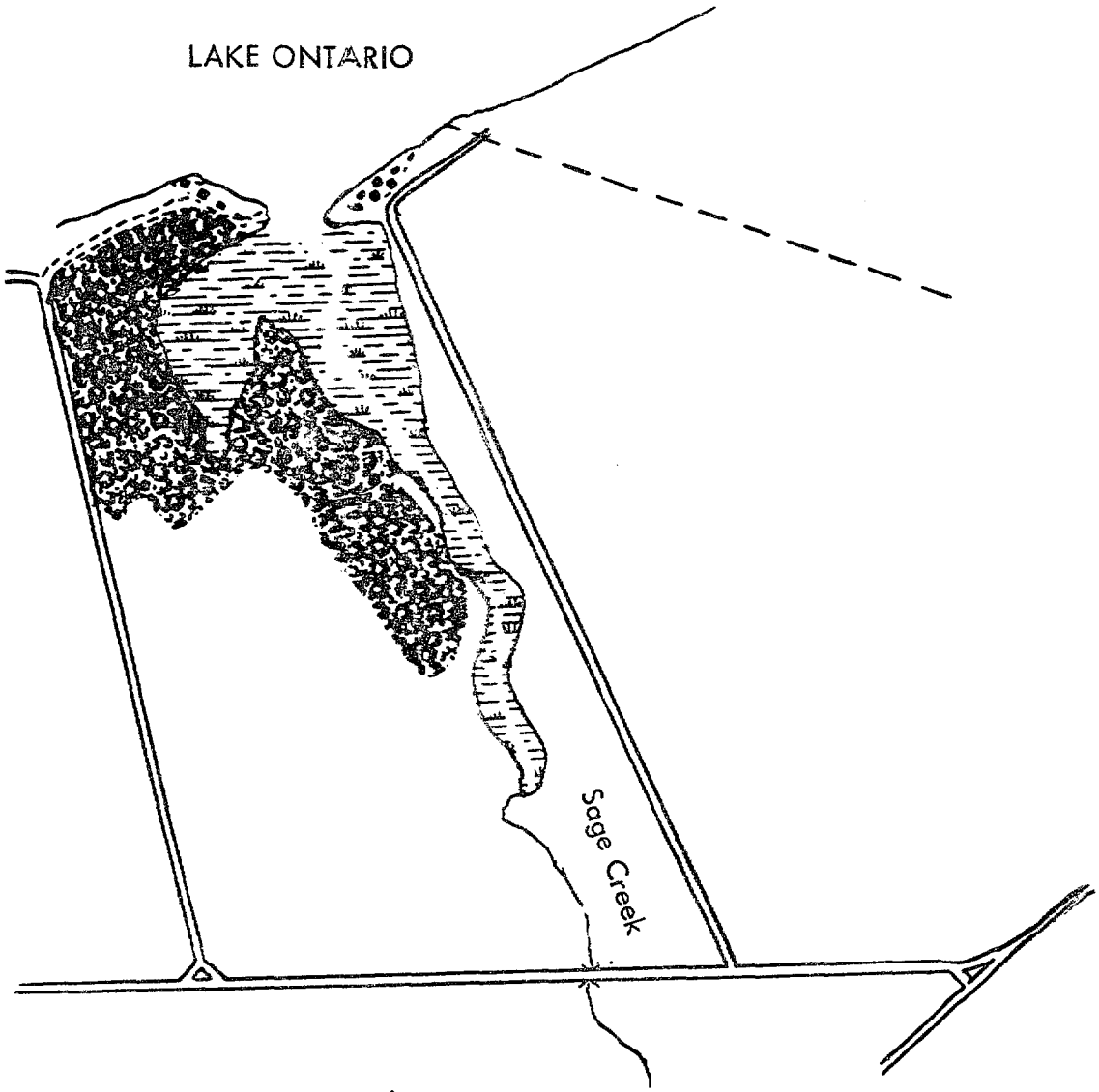
SAGE CREEK MARSH EAST



8. SAGE CREEK MARSH

LOCATION:	Mouth of Sage Creek. Town of Mexico, Oswego County
ACREAGE:	40 acres
WETLAND TYPE:	4 -- Inland deep fresh marshes 85% 5 -- Inland open fresh water 15%
GENERAL CHARACTERISTICS:	This is basically an open marsh, enclosed by a barrier beach adjacent to Lake Ontario.
HYDROLOGIC CHARACTERISTICS:	Surrounding highlands contribute to medium runoff and moderate flow. The marsh has good turnover of water.
WILDLIFE VALUE:	Medium. This unit is an excellent production area for wood and black ducks and mallards. Variety of fish includes bass, bullheads, and northern pike. Excellent producer of fur-bearers. Breeding area for Black tern and American bittern.
VULNERABILITY:	High
AGRICULTURAL POTENTIAL:	Low
OWNERSHIP:	State/private
COMMENTS:	Used for hunting and fishing. There is cottage development on barrier beach and in adjacent areas. This has been designated as an "important area" by NYS DEC.

SAGE CREEK MARSH

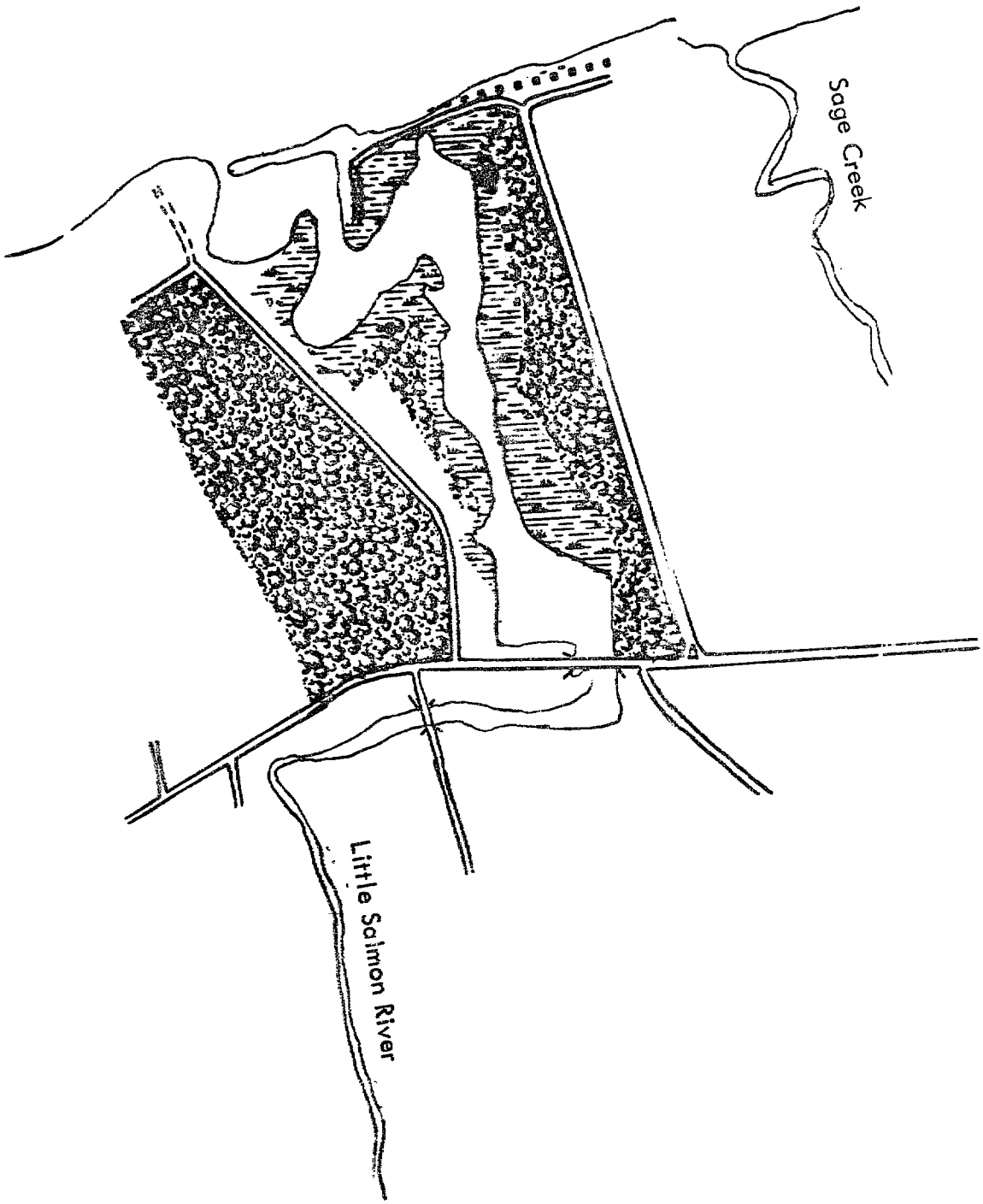


9. LITTLE SALMON RIVER MARSH

LOCATION:	Mouth of Little Salmon River ("Mexico Point"), Town of Mexico, Oswego County.
ACREAGE:	75 acres
WETLAND TYPE:	4 -- Inland deep fresh marshes 40% 5 -- Inland open fresh water 60%
GENERAL CHARACTERISTICS:	Largely open water due to flow of Little Salmon River and width of mouth; adjacent areas of marshes.
HYDROLOGIC CHARACTERISTICS:	Generally poorly drained due to its poor soil characteristics and low relief. Good turnover, however, due to stream volume.
WILDLIFE VALUE:	Medium to high. Upper limits of Little Salmon are used as Coho Salmon stocking unit; it is highly valuable for fish management purposes. There is little waterfowl production here.
VULNERABILITY:	High
AGRICULTURAL POTENTIAL:	Low
OWNERSHIP:	Public and private
COMMENTS:	Natural spit at mouth was eroded during storm. The NYS Office of Parks and Recreation is in process of constructing rip-rap breakwall. The area has boat-launching facilities and has been developed as low-intensity park/open space area. More intensive uses (e.g., harbor facilities) would probably disturb wetlands. Area has been designated as "important" by DEC.

LITTLE SALMON RIVER MARSH

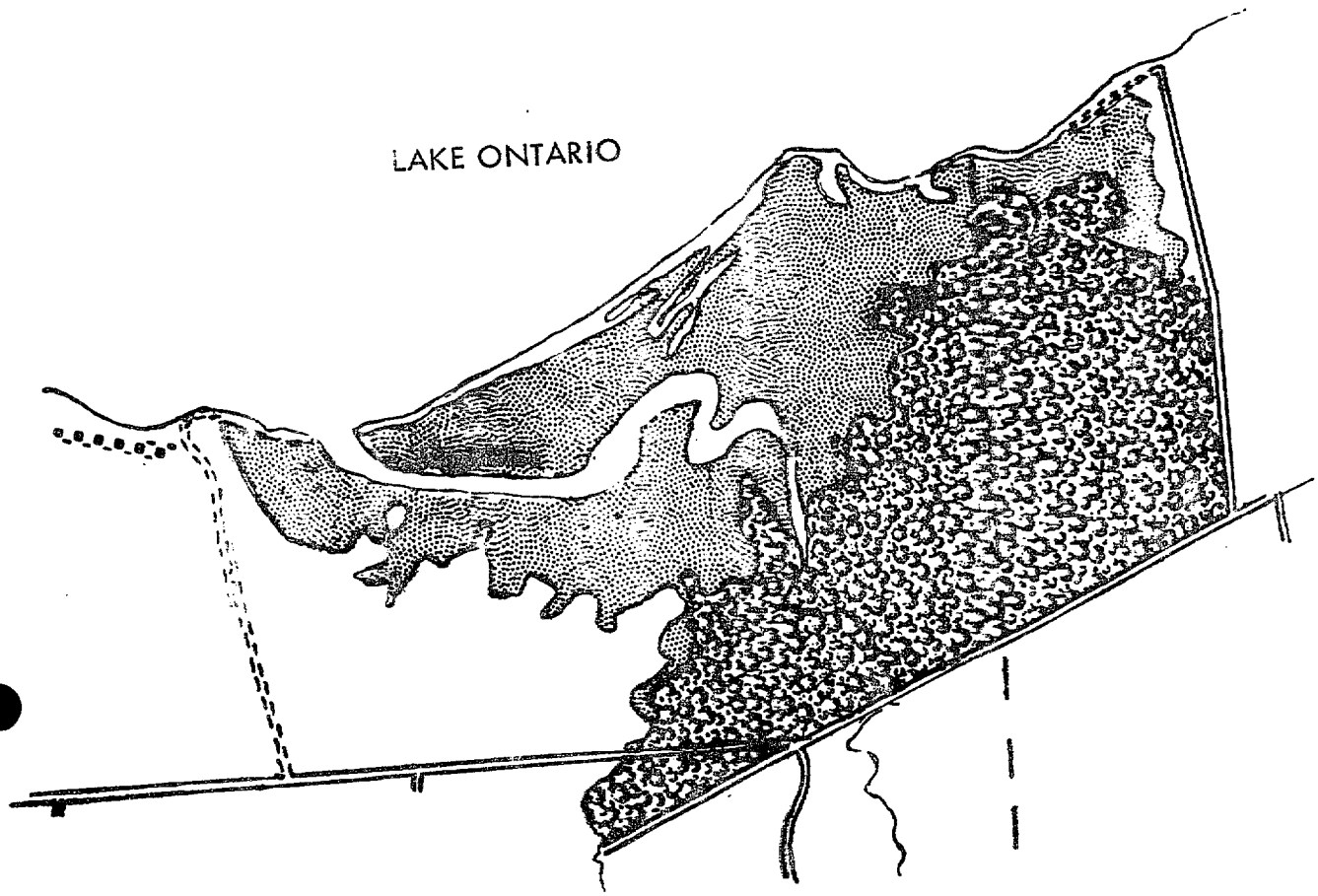
LAKE ONTARIO



10. BUTTERFLY MARSH

LOCATION:	Mouth of Butterfly Creek, Towns of New Haven and Mexico, Oswego County.
ACREAGE:	300 acres
WETLAND TYPE:	4 -- Inland deep fresh marshes 10% 5 -- Inland open fresh water 15% 7 -- Wooded swamps 75%
GENERAL CHARACTERISTICS:	This is extremely valuable extensive wetland area with optimum cover situation for fish and wildlife uses.
HYDROLOGIC CHARACTERISTICS:	Area has low gradient, poorly drained soils: relatively stagnant.
WILDLIFE VALUE:	High; the marsh has some limited pothole development for waterfowl enhancement. Waterfowl hunting is extensive during periods of high water levels in Lake Ontario. A major fur-bearing animal here is muskrat. Numerous breeding ducks found here: herons, rails, and gallinules.
VULNERABILITY:	High
AGRICULTURAL POTENTIAL:	Low
OWNERSHIP:	Public and private
COMMENTS:	The wetland is threatened by nearby cottage development, but could be improved for fish and wildlife by water level control and open channel development with pothole excavation.

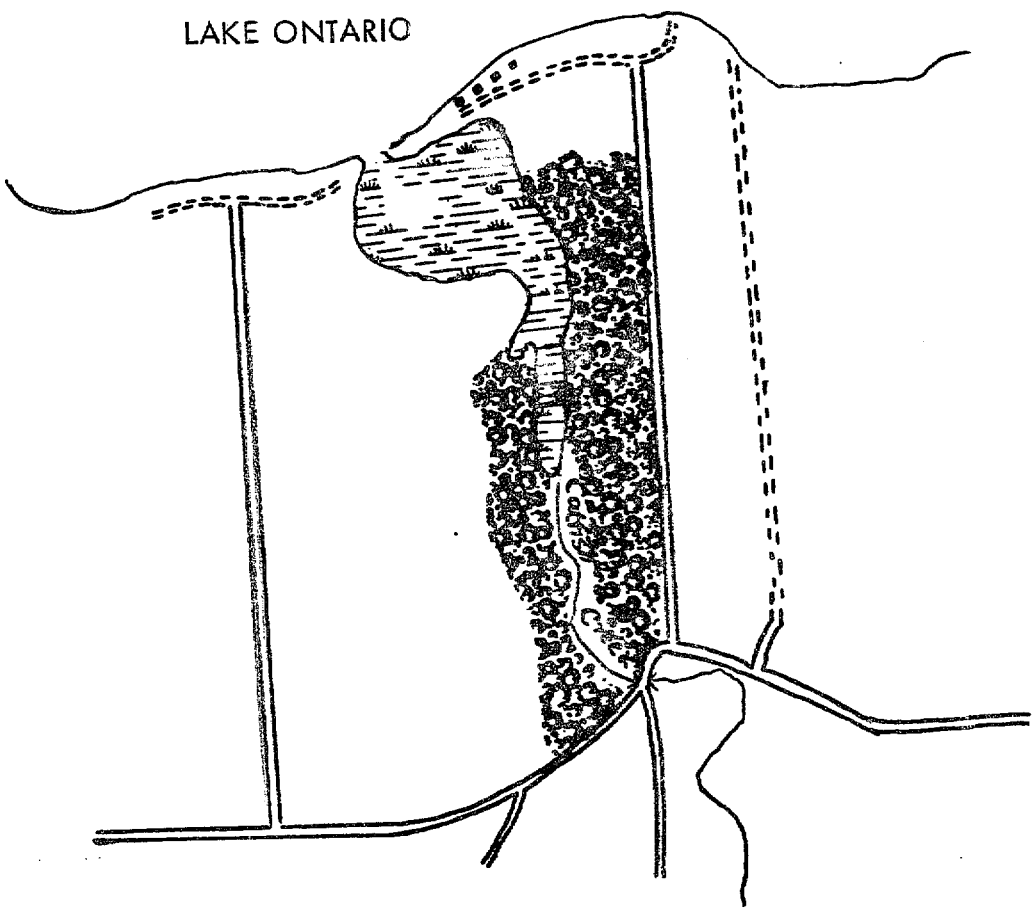
BUTTERFLY MARSH



11. CATFISH CREEK MARSH

LOCATION:	Mouth of Catfish Creek, Town of New Haven, Oswego County.
ACREAGE:	24 acres
WETLAND TYPE:	3 -- Inland shallow fresh meadows 70% 5 -- Inland open fresh water 30%
GENERAL CHARACTERISTICS:	A barrier beach separates most of marsh from Lake Ontario. A few cottages are nearby, but there is minimal human disturbance. A marina and boat-launching facility are adjacent to outlet at barrier beach.
HYDROLOGIC CHARACTERISTICS:	Low gradient and flow; medium rate of turnover; water level controlled by Lake Ontario.
WILDLIFE VALUE:	Medium; little waterfowl value due to small size, although there are some wood ducks, mallards, and black ducks. Northern pike and Largemouth bass are found here.
VULNERABILITY:	Medium
AGRICULTURAL POTENTIAL:	Low
OWNERSHIP:	Private
COMMENTS:	Because of small size and limited wildlife value, the potential for enhancement of marsh is extremely limited.

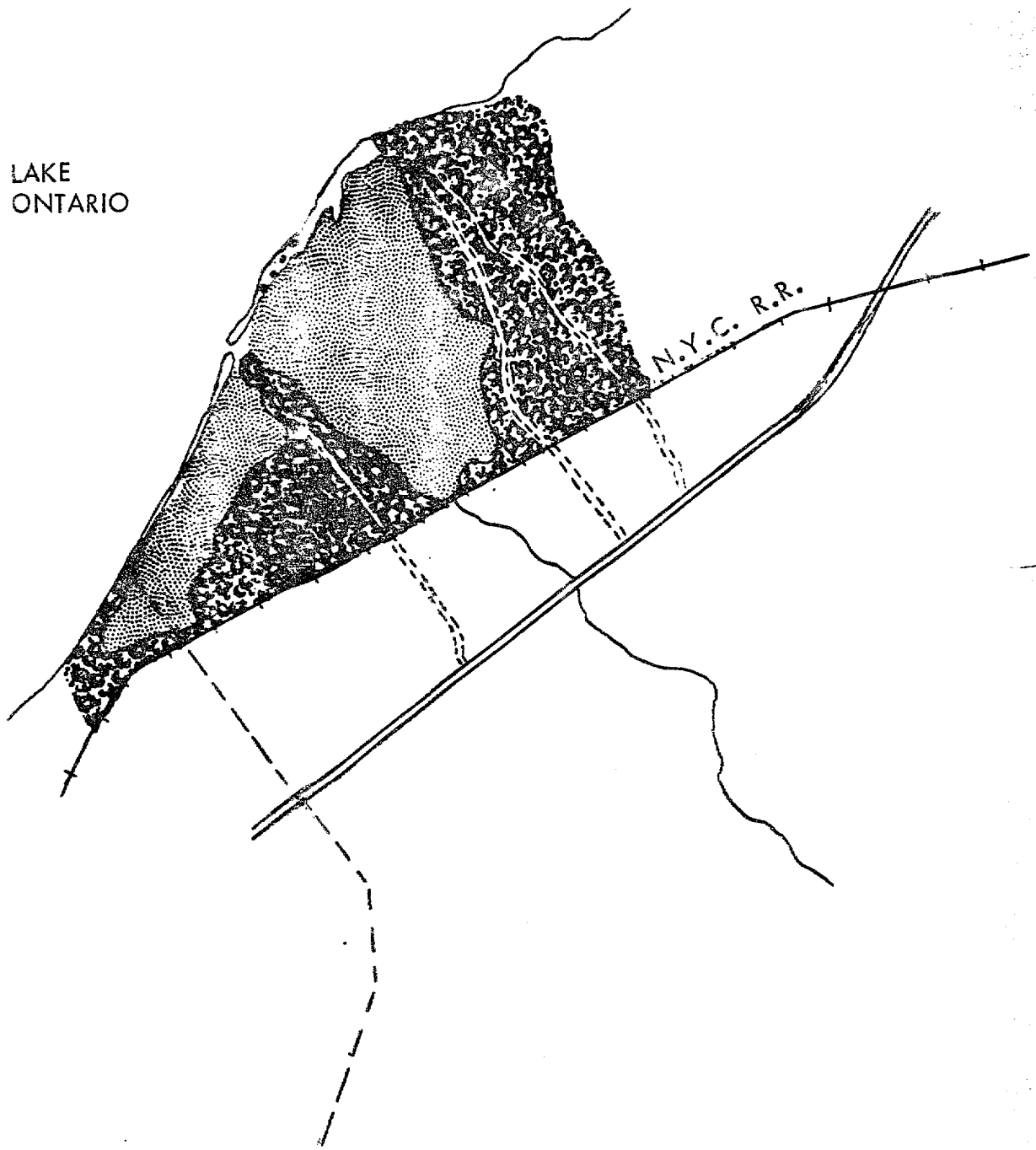
CATFISH CREEK MARSH



12. TEAL MARSH

LOCATION:	Northwestern part of Town of Scriba, Oswego County.
ACREAGE:	254 acres
WETLAND TYPE:	6 -- Shrub swamps 30% 7 -- Wooded swamps 70%
GENERAL CHARACTERISTICS:	A barrier beach separates the marsh from Lake Ontario.
HYDROLOGIC CHARACTERISTICS:	Poorly drained and susceptible to flooding. Lake Ontario controls water level in marsh.
WILDLIFE VALUE:	Medium. Could be enhanced for wood duck and dabbling duck production. Is nesting area for wood duck and hooded warbler.
VULNERABILITY:	High
AGRICULTURAL POTENTIAL:	Low
OWNERSHIP:	Private
COMMENTS:	Human impact is great at this unit because of its proximity to the City of Oswego. The barrier beach is completely developed for cottages and recreation. The interior of the marsh has not been disturbed. Wildlife activity here is medium but could be enhanced with better control of Lake Ontario water levels. Lack of muck peat soils and high acidity make the unit useless for farming.

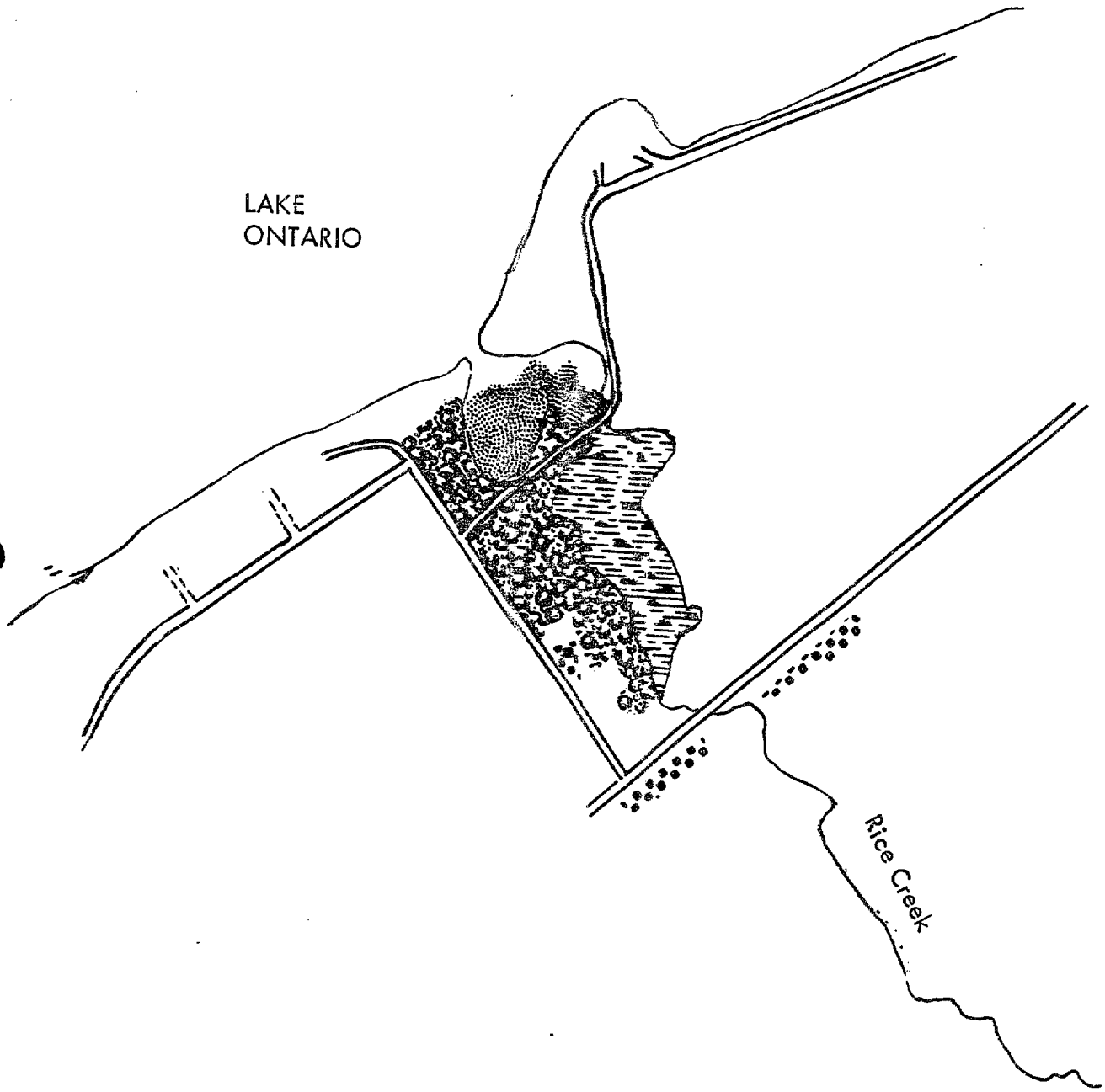
TEAL MARSH



13. RICE CREEK MARSH

LOCATION:	Mouth of Rice Creek, Town of Oswego, Oswego County.
ACREAGE:	45 acres
WETLAND TYPE:	3 -- Inland shallow fresh marsh 30% 4 -- Inland deep fresh marsh 40% 5 -- Inland open fresh water 30%
GENERAL CHARACTERISTICS:	Small barrier beach separates unit from Lake Ontario. This is relatively small unit.
HYDROLOGIC CHARACTERISTICS:	Low gradient, poorly drained; low volume and flow.
WILDLIFE VALUE:	Medium; used extensively for fishing but has low waterfowl value.
VULNERABILITY:	High
AGRICULTURAL POTENTIAL:	Low
OWNERSHIP:	Private
COMMENTS:	Landfilling operations and heavy human activity have made the unit useless to waterfowl. Fishing is extensive along the road through the marsh's middle portion. Closeness to the City of Oswego has resulted in a steady reduction of wildlife use.

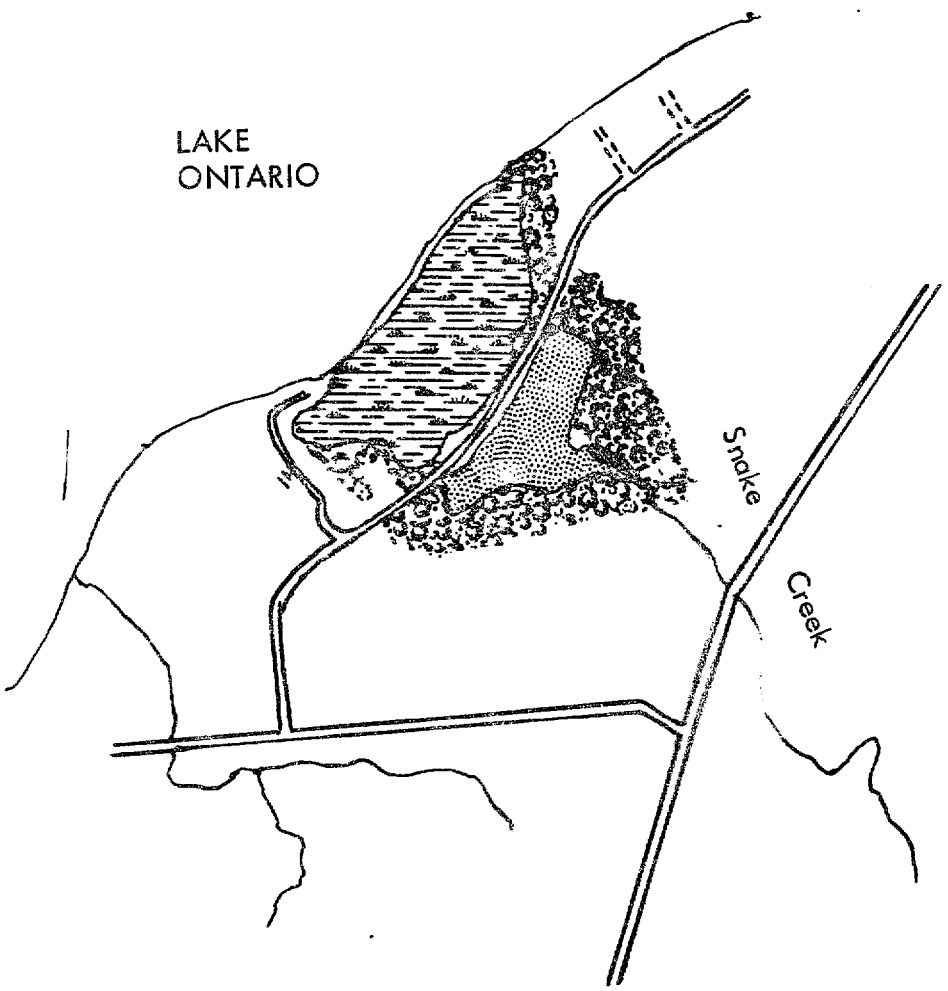
RICE CREEK MARSH



14. SNAKE CREEK MARSH

LOCATION:	Mouth of Snake Creek, Town of Oswego, Oswego County.
ACREAGE:	131 acres
WETLAND TYPE:	3 -- Inland shallow fresh marshes 30% 4 -- Inland deep fresh marshes 40% 6 -- Shrub swamps 30%
GENERAL CHARACTERISTICS:	A barrier beach completely separates the marsh from Lake Ontario.
HYDROLOGIC CHARACTERISTICS:	Poorly drained; drainage to Lake is through underground seepage.
WILDLIFE VALUE:	High; excellent habitat for wood ducks and black ducks, green heron, common gallinule, rails, owls, grouse, and red-bellied woodpeckers.
VULNERABILITY:	Medium
AGRICULTURAL POTENTIAL:	Low
OWNERSHIP:	Private
COMMENTS:	This unit is relatively inaccessible; there has been little human disturbance.

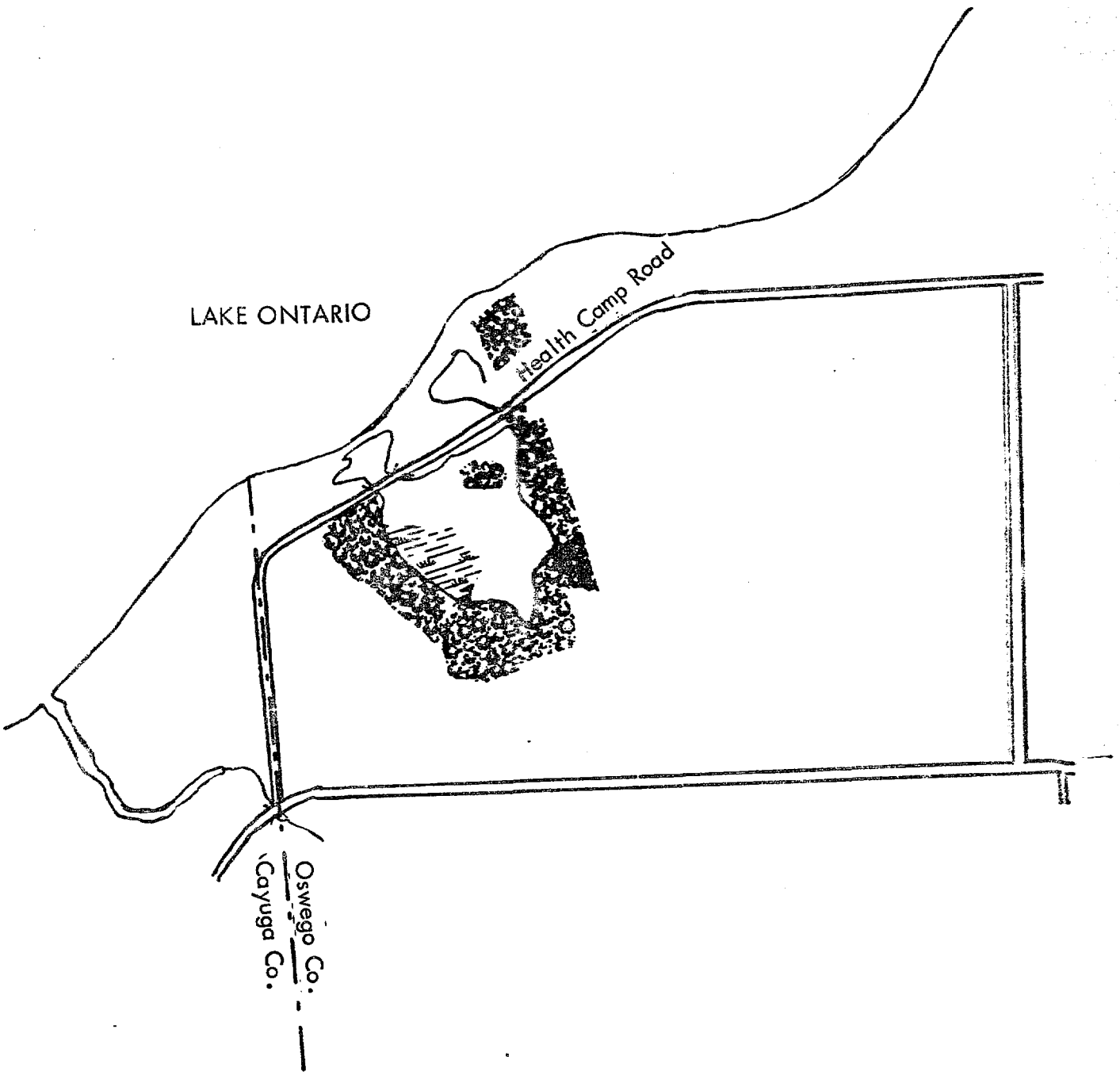
SNAKE CREEK MARSH



15. HEALTH CAMP ROAD MARSH

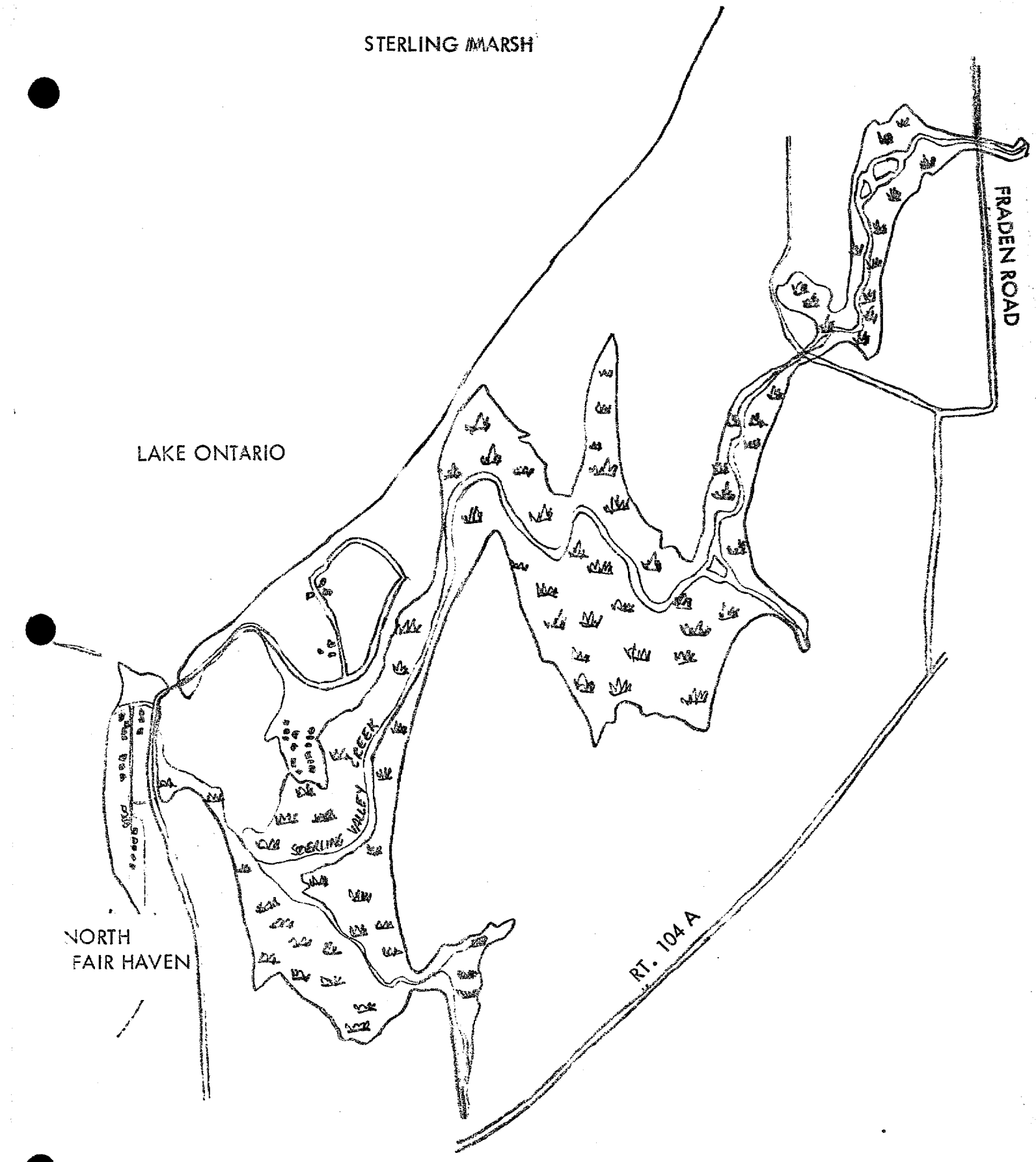
LOCATION:	Health Camp Road, Western Town of Oswego, Oswego County
ACREAGE	36 acres
WETLAND TYPE:	6 -- Shrub swamp 30% 7 -- Wooded swamp 70%
GENERAL CHARACTERISTICS:	The unit is separated from Lake Ontario by land. It is bordered on the west by agricultural lands. There is an excellent interspersion of cover types.
HYDROLOGIC CHARACTERISTICS:	No surface water outlet to Lake Ontario. Drainage is by underground seepage.
WILDLIFE VALUE:	High; the unit is high quality waterfowl habitat and is used by black ducks, mallards, and wood ducks for breeding and resting area.
VULNERABILITY:	Medium
AGRICULTURAL POTENTIAL:	Low
OWNERSHIP:	Private
COMMENTS:	Designated as "important area" by NYS DEC.

HEALTH CAMP-CAMP ROAD MARSH



16. STERLING MARSH

LOCATION:	Terminus of Sterling Creek through Fair Haven Beach State Park, east in an irregular pattern to Fradin Road, town of Sterling, Cayuga County.
ACREAGE:	1030 acres
WETLAND TYPE:	Component wetland classification not currently available.
GENERAL CHARACTERISTICS:	Large, inland, deep fresh water cattail marsh.
HYDROLOGIC CHARACTERISTICS:	Less than 1% slope creates slow flow; meandering main stream channel.
WILDLIFE VALUE:	High. These marshes are utilized by both migrating waterfowl in the spring and fall and as nesting cover in the spring. Muskrat, mink, and raccoon are among valuable wildlife found in area. Marsh is good for warm water fish such as pickerel, small mouth bass, and bullheads. This marsh also serves as habitat potentially available for endangered species of peregrine falcon, bald eagle, and osprey.
VULNERABILITY:	Moderate
AGRICULTURAL POTENTIAL:	Low
ONWERSHIP:	State and private
COMMENTS:	A section of the westernmost area of the marsh is included in the Fair Haven Beach State Park. The marsh is not readily accessable and remains aesthetically pleasing and in a natural state. Fishing rights acquisition has been proposed along Sterling Valley Creek and Sterling Creek, including wetlands, to Route 104A.



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CONCLUSION

As indicated, wetlands exhibit certain natural characteristics which make development for high intensity land uses undesirable. Generally, such characteristics may be categorized into two distinct types: (1) ecological values and (2) inherent physical properties.

Ecological Values

Scientific evidence indicates that wetlands are essential to wildlife productivity in that they act as converters in the aquatic ecosystem. Wetlands often provide vital habitat for various fauna, including birds and upland mammals and other wildlife, in addition to aquatic and amphibious species. Many fauna and flora found in wetland areas are endangered species. In accordance with the objectives of the Central New York Coastal Zone Management Program and the NYS Freshwater Wetlands Act and Endangered Species Act, certain wetlands should be preserved. As discussed in Technical Memo #9 of the coastal zone program, these areas are of particular concern in that potential conflicts exist between natural resources and possible future land and water uses.

Physical Characteristics

As discussed under General Wetlands Characteristics in this memo, and in Hydrologic Characteristics (#4) and Soils and Geology (#5), wetlands display various hydrologic characteristics which conflict with intensive development.

Among the most serious environmental problems is damage to (and from) the coastal zone's surface and groundwater supply. These damages consist of pollution of surface and groundwater, flood damage, water shortages, and increased erosion and siltation. Water pollution results from septic drainage from houses too concentrated along shorelines, inadequate municipal sewage treatment facilities, agricultural animal wastes, fertilizers, and pesticides draining into surface water and into groundwater aquifers, and inappropriate landfill in wetlands.

As shorelines, aquifer recharge areas, and other areas are paved and roofed, as wetlands are filled or drained, and as trees or other vegetation are removed from the land surface, rain water which was formerly detained until it could percolate into the soil flows more rapidly into streams, rivers, and lakes, including Lake Ontario. Two hazards result: one is an increase in flooding, the damages from which are aggravated by increased development on flood plains. The other hazard is a decrease in the groundwater supply available for domestic and municipal wells.

An increased flow of surface water, combined with improper construction and agricultural practices, also often leads to erosion of good soils and deposition of silt in lakes, on roadways, or in other inappropriate locations. Building and highway construction on wet, unstable soils is also frequently more costly than anticipated. Settling foundations, wet basements, and landslides are not uncommon results of such construction.

Recommendations

1. Wetlands in general should be regarded as critical areas and should be kept free from infringement of land uses which result in drainage, dredging, pollution, destruction of wildlife habitat, and/or flooding.

2. The following wetlands should be acquired under the NYS Environmental Bond Act:

   a. Deer Creek Marsh (1200 acres)

   b. Snake Creek Marsh (131 acres)

   c. Butterfly Marsh (300 acres)

   d. Grindstone Creek Marsh (131 acres)

3. Detailed investigations of flora and fauna should be undertaken by the NYS DEC and/or other appropriate agency(ies) to determine wetland importance as habitat areas.

4. Central New York Coastal Zone Management Program should continue to incorporate new data into the development of a management program as information on wetlands becomes available. Specifically, a monitoring and updating mechanism should be developed in cooperation with other existing or potential investigators, including NYS DEC, SUC at Oswego (NSF Study), and others.

5. CNY CZM contractors should participate in NYS Freshwater Wetlands Program implementation as a party-of-interest involving any coastal wetland.

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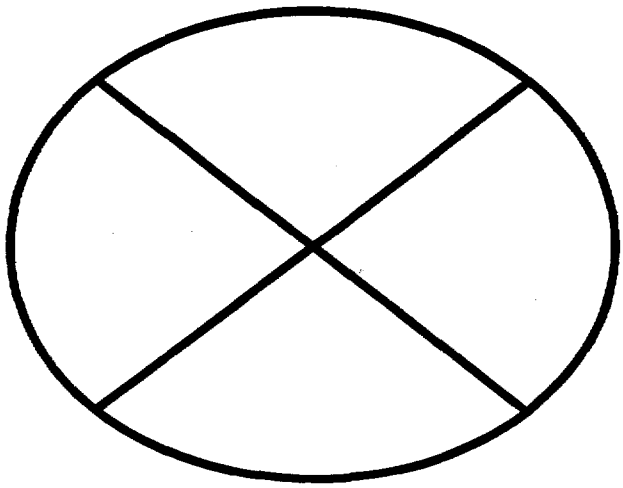

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HYDROLOGIC CHARACTERISTICS

CENTRAL NEW YORK COASTAL ZONE MANAGEMENT PROGRAM

PHASE I: TECHNICAL MEMO #4

NOVEMBER 1975

INTRODUCTION

The hydrologic cycle involves the movement of water from the atmosphere to the earth and back again. This cycle involves three main units. These are the subsurface unit, or groundwater; surface waters, including streams and lakes; and the atmosphere. Subsurface water is found in gaps in consolidated and unconsolidated deposits. Surface water, in addition to identifiable lakes and streams, includes watersheds and varying amounts of surface water runoff. The atmosphere is obviously concerned with climatic characteristics.

The Central New York coastal zone is a part of the Lake Ontario Plain. Surface topography dips generally north to the Lake while underlying bedrock units dip to the south. Coastal zone bedrock is a product of ancient seabed sediment deposition, while surface features are remains of glaciation and meltwater action, and the forces of surface water runoff.

Purpose of Study

Coastal hydrology is important in that is concerned with the quantity and quality of surface and groundwater supplies. Characteristics of surface water phenomena and aquifers and aquifer recharge areas are important determinants in making recommendations concerning type and extent of development.

Water supplies are important for their productive and supportive characteristics, e.g., supporting distinct plant and animal communities in addition to fish in lakes and streams, and as sources of water for domestic and industrial uses. But hydrologic characteristics also indicate potential hazards to human activities, e.g., flooding.

This memo, then, notes the importance of various hydrologic phenomena as they relate to existing or potential development patterns and activities in the CNY coastal zone.

Scope of Study and Study Area

While areal hydrologic phenomena of the coastal area (i.e., located within the proposed CNY coastal zone) are important, consideration must be given to a broader area as it is the size and extent of watersheds which to a large degree affect the hydrology in coastal areas. This memo, therefore, provides an inventory and analysis of lakes and streams tributary to Lake Ontario in addition to more localized information.

This study notes climatic, surface water, and groundwater data, and to the extent that information is available identifies known flood hazard areas. It also reports erosion and lake level problems as they affect coastal resources and structural development.

CLIMATE

The general climate of the Central New York coastal zone is characterized as humid continental. The climate is similar to that of the northeastern United States except for the presence of a large lake system. The climate is predominantly governed by atmospheric flow from the west and northwest, and occasionally, by warm, humid air flowing from the west-southwest in summer. Maritime influence is a secondary factor affecting the continental character of the coastal zone climate with occasional cool, damp, and cloudy weather affecting the area as a result of air flows from the Atlantic Ocean.

Summers are short and cool with temperatures averaging about 70 F. while winters are severe, averaging 25 F. with moderately heavy snowfall. Precipitation occurs in the form of rain, primarily thundershowers, in the summer months, and snow in the winter. Average snowfall ranges from 70" in the western area of the coastal zone to 150" in the eastern area bordering the Tughill highlands. Winds prevail from the west. High winds occur as a result of intense winter storms and remnants of tropical storms and severe thunderstorms. Fog occurs on approximately 15 to 20 days per year in the coastal zone. Haze and cloudiness are quite common.

Lake Ontario's effect on the coast is largely determined by shoreline orientation and topography. As dry air moves eastward across the lake, water vapor accumulates and moves shoreward. In summer the cooler water of the lake feeds warm air masses while in winter, the relatively warmer lake water feeds cold air masses. As the air masses move over landforms, the air cools and condensation occurs. Precipitation then falls in the form of rain, snow, hail, or sleet, depending on temperature and other atmospheric conditions. This "lake effect" precipitation is a common phenomenon occurring all along the coast. It is particularly significant in the area bordering the Tughill Plateau because of its higher elevation. Average annual precipitation in the coastal zone ranges from 35" in Sterling in Cayuga County to 46" in the northwesternmost part of the coastal zone.

Proximity to the lake imposes a moderating effect on the coastal climate. The prevailing westerly and northwesterly winds cross the length of the lake cooling air in summer and tending to warm it in the winter.

GROUND WATER

Groundwater is subsurface water contained in soil and bedrock units. The limitations imposed on groundwater movement, discharge, recharge, and quality are functions of the structural and chemical characteristics of the enclosing soil and bedrock.

Groundwater resources are moderate to poor with respect to availability and quality in the Central New York coastal zone. These conditions are a result of the dominance of fine-grained consolidated deposits (bedrock) and moderately impermeable unconsolidated deposits. Except those areas near Richland and Altmar which are overlain by well-sorted outwash and deltic deposits, the coastal zone area is generally covered with a thin layer of lake clays, glacial tills, silts, and fine sands.

The consolidated deposits in the coastal zone consist of three main groups of bedrock formations, based on similarity of lithology and water-bearing properties. In the northernmost area of the coastal zone south to near Richland, the Lorraine group, consisting of black and grey shale, gray siltstone and sandstone, and calcareous concretions and nodules, forms the bedrock unit. This group ranges up to 2,200 feet thick with water collecting along joints and bedding planes and possibly in irregular pore spaces in some sandstones. Yields from this group may reach 100 gallons per minute (gpm), but average 6-10 gpm.

The two consolidated groups which underlie the remainder of the coastal zone are the Oswego sandstone group and the Medina group and Queenston formation. They form broad belts running roughly east-west. The Oswego group is located in the area bounded by the town of Richland to the north and the city of Oswego in the south. The Medina group and Queenston formation underlies the remaining areas of Oswego County and all of Cayuga County which are in the coastal zone.

Oswego sandstone is a grey, fine-grained sandstone, averaging 500 feet thick with water found along joints and bedding planes. Yields maybe as high as 125 gpm but average 10 gpm. Water location and yields are similar for the Medina group and Queenston formation, although this bedrock unit is characterized as red, fine- to coarse-grained, massive sandstone.

The predominance of glacial till in the lower horizon of unconsolidated deposits in many areas of the coastal zone tends to limit water yield. The till contains much fine-grained material, has poor permeability, and thus transmits water poorly. Similar restrictions limit water yield from fine-grained lake-laid deposits and clayey deposits. Water yield from wells in the above unconsolidated deposits rarely exceed 3 gpm. There are no high yield (500 gpm) wells currently tapped in the coastal zone area.

Isolated areas of sorted, coarse-grained deposits occur in the vicinity of the Village of Altmar. The source of these deltic deposits is due to run-off of glacial meltwater flowing from the adjacent Tughill highlands. They are generally concentrated as channel deposits in stream valleys and as terrace deposits on valley walls. Where units of sufficient size are present, these outwash deposits, usually reworked and well-sorted highly permeable sands and gravels are the major groundwater source in the area. Wells in the water supply system of the Village of Mexico (to the south of the coastal zone) tap groundwater from such deposits as would prospective well sites to the east of the village of Pulaski.

SURFACE WATER

The dominant surface water feature of the coastal zone is Lake Ontario. The Ontario Lake Basin (excluding the Oswego River) in Central New York is characterized by short streams and small drainage basins, and there are many small lakes and wetland areas included in the drainage pattern. Forests and woodlands are the predominant land use. Some of the land is used for agricultural purposes: grazing, croplands, fruit orchards, and muck farming. There are eight villages and parts of the City of Oswego within the drainage area, and all or part of about 20 towns. All or parts of eight towns, six villages, and Oswego are within the Central New York coastal zone.

The Ontario Lake Basin drains the northern and western sections of Oswego County and the northern section of Cayuga County. The streams of the lake plain generally parallel each other as they flow to Lake Ontario.

Two watersheds within the basin are relatively large with most of their drainage area inland of the coastal zone. The Oswego River system has a small area, including the main channel and flood plain in the City of Oswego, within the coastal zone. The Salmon River watershed in the coastal zone includes the mouth, main channel, and associated wetlands up to Altmar. Neither basin drains large areas of the coastal zone itself, serving largely as transfer areas for upland watersheds. The remainder of the coastal zone drains into Lake Ontario by way of some two dozen small watersheds which are aggregates of streams and creeks in the area.

In addition to the Oswego and Salmon Rivers, major or important surface water features include North and South Sandy Ponds, the Little Salmon River, and Little Sodus Bay.

Streams in the Ontario Lake Basin display a generally dendritic drainage pattern imposed upon the glacial land forms which terminate in the coastal zone. Average annual runoff from coastal watersheds ranges from 18" in Cayuga County to 25" in the easternmost areas of the coastal zone in Oswego County. Groundwater recharge areas benefiting from infiltration of the surface water are located along the Salmon River from near the Town of Pulaski to the Village of Altmar.

The entire coastal zone is an area of surplus precipitation. Loss of moisture through evapotranspiration ranges from 18 to 22 inches, substantially less than average precipitation. Consequently, coastal zone streams exhibit year round flows except in isolated cases of drought when an absence of precipitation combined with increased water transpiration by plants during the growing season limits water movement into surface channels from aquifers and surface runoff creating a temporary situation of negative water yield.

Due to the absence of sizeable groundwater recharge units (discussed above) which may absorb precipitation, and the general impermeability of subsurface soils and bedrock units, water yield in the coastal zone is closely equivalent to stream flow. Average annual stream flow in the coastal zone area ranges from 2.0 cubic feet per second per square mile (CFSM) in the eastern limit of the coastal zone in Oswego County to 1.2 CFSM in Cayuga County.

Stream flow data for all watersheds and streams in the coastal zone are not available restricting development of base flows and flow-duration curves. Consequently, it is difficult to determine the role coastal zone streams and any aquifer recharge areas play in the retention and storage of runoff, and subsequent release, particularly that associated with spring meltwater.

Flooding and Erosion Problems

Several areas within the Ontario Lake Basin have been recognized by HUD and/or USGS as flood hazard areas: These include areas adjacent to the following waterbodies:

1. Lake Ontario
2. Skinner Creek
3. Lindsay Creek
4. Mud Creek
5. Blind Creek
6. Little Sandy Creek
7. North and South Ponds
8. Deer Creek and Little Dear Creek
9. Salmon River
10. Mud Creek
11. Grindstone and Little Grindstone Creeks
12. Snake Creek
13. Sage Creek
14. Little Salmon River
15. Butterfly Creek
16. Catfish Creek
17. Otter Branch Creek
18. Wine Creek
19. Oswego River
20. Rice Creek
21. Snake Creek
22. Eightmile Creek
23. Ninemile Creek
24. Sterling Valley Creek
25. Sterling Creek
26. Little Sodus Bay
27. Blind Sodus Creek

The lake shore and several stream reaches have flood hazard areas. Fourteen of the municipalities in the coastal zone have land use controls, and most have restrictions in their codes which control land use in flood hazard areas, but there is existing development located within these areas which is subject to damage due to flooding. Much of the costs of flood damages are unrecoverable by public and private landowners. Participation in the National Flood Insurance Program can help a community and its residents alleviate some of this loss.

Few major facilities exist to control stream flows. This is probably due to the relatively minor nature of most of the streams in the Basin. The most important structure is the dam on the Salmon River Reservoir, operated by Niagara-Mohawk Power Corporation. Although basically an electric-generating

facility, the dam has some flood-control features in that the reservoir behind it has a very large capacity. Levees have also been constructed adjacent to the lower reaches of the Salmon River to control flooding. However, even with these improvements on the Salmon River watershed (the largest in the Ontario Basin in Central New York), some flooding does occur. Thus, it is important to control the use of land adjacent to the river.

There is a dam on Ninemile Creek, in the Village of Hannibal, which helps control flooding along the lower part of the creek, and in addition, some channel improvements have also been made. There is still some flooding, however.

The total length of the Lake Ontario shoreline in Cayuga and Oswego counties is about 43 miles. The area from Fair Haven to the City of Oswego consists chiefly of a series of drumlins and wetland areas. Many bluffs along the shoreline are eroding, and in some cases houses are close to the receding line of the bluffs. Beaches in this area are generally less than ten feet wide, and are of sand and gravel material. Because of flooding and erosion of shore areas, land use should be carefully controlled.

Just northeast of Oswego, to New Haven, shore bluffs are from five to 25 feet high. Problems are similar to those mentioned above. The remaining Oswego County shoreline consists of occasional reaches of high ground and wetlands, and barrier beaches and sand dunes north of the Salmon River. These areas are subject to erosion and flooding problems from lake effects, and the encroachment of residential development.

A relatively large part of the frontage of Cayuga and Oswego Counties is of particular interest as wildlife habitat because of large marsh areas and protected ponds along the shore. The shoreline is subject to significant erosion where unprotected, except for a few short reaches where bedrock surfaces and reduces the effect of wave action.

Damages to shore property on Lake Ontario have been significant, particularly due to flooding of low areas around ponds, bays, and barrier beaches. Information is available on total damages to shore property in Wayne, Cayuga, and Oswego Counties, and is shown in the table below:

Total Damage to Shore Property on Lake Ontario -- Wayne, Cayuga, and Oswego Counties, New York

Land Use	Damages, $	
	Actual 1951-52 Value	Updated 1970 Value
Private		
Residential	$46,900	1,248,500
Industrial and commercial	34,800	67,200
Total, private property	$81,700	1,315,700
Public		
Parks and beaches	$32,900	422,600
Total, public property	$32,900	422,600
Total erosion damages	$64,600	1,738,300

Source: Great Lakes Region Inventory Report: National Shoreline Study Corps of Engineers.

Studies made at Fair Haven Beach State Park and Selkirk Shores State Park showed that at Fair Haven the average rate of erosion of the high bluff had been four feet per year between 1938 and 1952. The lower, 10-foot high bluff had eroded at a rate of ten feet per year. At Selkirk Shores, 40 feet of the bluff were lost during the failure of a concrete crib seawall in 1952.

The regulation of Lake Ontario levels (see also discussion below), in effect since 1960, following completion of the St. Lawrence Seaway, has reduced erosion and flood damage. In 1969, when record or near-record high levels occurred in the upper lakes, the levels of Lake Ontario were less than 0.5 foot above the long term average levels during the summer. They were actually below the long term average level for the rest of the year.

During an inspection of the shore made in 1966, it was found that about 0.4 mile was protected in Cayuga County, and 2.5 miles were protected in Oswego County, generally by seawalls. (This included 1.4 miles behind the breakwaters at Oswego Harbor.)

Lake Ontario Water Levels

Lake Ontario's water surface is approximately 245 feet above sea level. It is approximately 804 feet deep at its deepest location, where the bottom

is 561 feet below sea level, lower than the bottom of any of the other Lakes except Lake Superior.

The Great Lakes Basin Commission has reported in Appendix 11, Levels and Flows of its Framework Study, that the average or normal elevation of the lake surface varies irregularly from year to year. During the course of each year, the surface is subject to a consistent seasonal rise and fall, lowest in winter, highest in summer. In the 110 years from 1860 to 1969 the difference between the highest (248.06 in June 1952) and the lowest (241.45 in November 1934) monthly mean stages was 6.61 feet. The greatest annual fluctuation as shown by the highest and the lowest monthly means of any year was 3.58 feet, and the least annual fluctuation was 0.69 foot. The maximum recorded short-period rise at Oswego for the period 1931-1968 was 2.1 feet. This value was obtained by comparing the maximum instantaneous levels recorded each month with its monthly mean level.

The regulation of Lake Ontario as part of the operation of the St. Lawrence Seaway and Power Project has decreased the range of lake level fluctuations. High lake levels are reduced by one-half foot, although bank and shore erosion continues throughout the Central New York coastal zone. East of Sodus Bay, homes will soon be lost because of extensive erosion. Other erosion problems exist at Selkirk Shores State Park, Fair Haven Beach State Park, and near Sterling Creek outlet.

Ice jams at the mouths of streams are not a problem along the shore of the coastal zone. The ice build-up that does occur along the shore dampens the wave action and protects the shoreline.

Ten miles northeast of Oswego, nuclear power plants will provide power for upstate New York through three 345,000-volt transmission connections. The Nine Mile Plant, opened by the Niagara Mohawk Power Corporation in 1969, has a gross capacity of 642,000 kW. The Fitzpatrick Plant, under construction by PASNY, was expected to begin operation in 1974 at 850,000 kW. A second plant is planned at Nine Mile for 1978. These plants will increase consumptive water loss for Lake Ontario. Large lakes and reservoirs in the Oswego basin affect Lake Ontario elevation fluctuations, especially during spring thaws.

CONCLUSION

As indicated, hydrologic phenomena present both opportunities and problems to residents and visitors to the CNY coastal zone. Virtually every stream causes some flooding of adjacent lands. CZM planning is hampered by a lack of detailed stream gaging information; to better understand flooding and stream level and discharge, this information must be obtained.

Shoreline erosion problems are increasing, if only because of higher property damages due to inflation. There are increased demands on the part of lake shore property owners for shoreline protection structures. A combination of such facilities where warranted based on existing federal criteria, and flood plains and shoreline management, will be necessary to reduce damages in the future.

Recommendations

1. Stream gaging data should be obtained for several small watersheds in the coastal zone for use in determining stage and discharges and as an aid in delineation of flood hazard areas.

2. CZM program should be conducted with the HUD mapping program for NFIP

3. Efforts to ensure local compliance with NFIP regulations should be increased.

4. Detailed information on coastal groundwater supplies should be obtained to identify those resources most valuable as sources of domestic and/or municipal water supply.

Stream Gaging Stations

Big Deerlick Creek in Jefferson Co.
(Partial Record Station)
Discharge 1.2 C.F.S. 7-30-71

Skinner Creek in Jefferson Co.
(Partial Record Station)
Discharge 7 C.F.S. 7-30-71

Lindsey Creek near County Line
(Partial Record Station)
Discharge .10 C.F.S. 7-30-71

Mud Creek at Weaver Road
(Partial Record Station)
Discharge .84 C.F.S. 7-30-71

Blind Creek at Hadley Road
(Partial Record Station)
Discharge .70 C.F.S. 7-30-71

04250555
Little Sandy Creek at Sandy Pond Corners
(Partial Record Station)
Discharge 88 C.F.S. 4-5-72

04249060
Little Salmon River at Texas
(Partial Record Station)
Discharge 14 C.F.S. 9-11-73

Otter Branch at North Road
(Partial Record Station)
Discharge .84 C.F.S. 8-2-71

Deer Creek at Clark Road
(Partial Record Station)
Discharge .80 C.F.S. 7-30-71

Little Deer Creek at Clark Road
(Partial Record Station)
Discharge 144 C.F.S. 8-17-72
Discharge 1,790 C.F.S. 8-17-72

042250503
Salmon River at Pulaski
(Partial Record Station)
Discharge 144 C.F.S. 8-17-72
Discharge 1,790 C.F.S. 8-17-72

Grindstone Creek at Daysville Corners
(Partial Record Station)
Discharge 26 C.F.S. 7-30-71

Snake Creek at County Route 3
(Partial Record Station)
Discharge 4.1 C.F.S. 7-30-71

042-3190
No. Branch Salmon River near Mad River
(Partial Discharge Station)
Discharge 228 C.F.S. 10-31-72

042-3200
North Branch Salmon River at Redfield
(Partial Record Station)
Discharge 93 C.F.S. 9-27-72

Catfish Creek at Demster
(Partial Record Station)
Discharge 7 C.F.S. 8-2-71

042[illegible]050
Catfish Creek at New Haven
(Partial Record Station)
Discharge 50 C.F.S. 4-18-73
Discharge 1.6 C.F.S. 9-11-73

Little Salmon River at Arthur
(Partial Record Station)
Discharge 22 C.F.S. 7-26-71

Sage Creek near Arthur
(Partial Record Station)
Discharge 2.4 C.F.S. 8-2-71

Little Salmon River at Mexico
(Partial Record Station)
Discharge 27 C.F.S. 7-29-71

Black Creek at Mexico
(Partial Record Station)
Discharge 28 C.F.S. 7-26-71

Little Salmon River near Colosse
(Partial Record Station)
Discharge 28 C.F.S. 7-26-71

No. Branch Little Salmon River at Parish
(Partial Record Station)
Discharge 9.4 C.F.S. 7-28-71

So. Branch Little Salmon River at 69A
(Partial Record Station)
Discharge 13 C.F.S. 7-27-71

04249C10
Lake Ontario at Oswego
Max. Stage 248.96 ft. 6-6-52
Min. Stage 240.94 ft. 12-23-34

04249000
Oswego River at Lock 7 Oswego
Ave. Discharge 6,447 C.F.S.
Max. Discharge 37,500 C.F.S. 3-28-36
Min. Discharge 30 C.F.S. 11-6-44
Max. Stage 13.46 ft. 4-10-40
Min. Stage .97 ft. 8-24-34

04232162
Rice Creek at Fruit Valley
(Partial Record Station)
Discharge 86 C.F.S. 4-5-72

Snake Creek at 104 A
(Partial Record Station)
Discharge .20 C.F.S. 8-3-71

Eightmile Creek at 104A
Partial Record Station
Discharge 1.2 C.F.S. 8-3-71

Ninemile Creek near North Sterling
(Partial Record Station)
Discharge 4.6 C.F.S. 9-28-71

Sterling Valley Creek at Sterling Valley
(Partial Record Station)
Discharge 3.3 C.F.S. 8-3-71
Discharge 2.2 C.F.S. 9-28-71

04232100
Sterling Creek at Sterling
Ave. Discharge 61.3 C.F.S.
Max. Discharge 1,490 C.F.S. 4-4-60
Min. Discharge 0.32 C.F.S. 9-14-66
Max. Stage 5.13 ft. 4-4-60
Min. Stage 1.5 ft. 9-14-66

Little Sodes Bay at Mouth
(Partial Record Station)
Discharge 0 C.F.S. 8-3-71

04232150
Ninemile Creek at Hannibal
(Partial Record Station)
Discharge 16 C.F.S. 6-13-72

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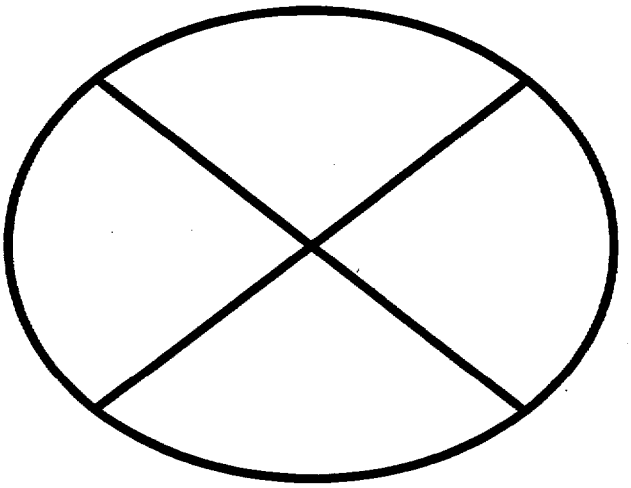

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COASTAL SOILS AND GEOLOGY

CENTRAL NEW YORK COASTAL ZONE MANAGEMENT PROGRAM

PHASE I: TECHNICAL MEMO #5

SEPTEMBER 1975

I INTRODUCTION

Planning for proper land use must take into account the potentials and limitations of geology and soils. One needs to know the location and extent of soils free from flooding; the soils that are dry most of the time; the soils that have high bearing strength and do not require extensive foundations; the permeable soils suitable as septic tank filter fields; the deep soils that do not present problems if excavated for basements, pipelines, or highways; geologic information for the selection of sites suitable for mineral extraction, industrial construction, and disposal of liquid and solid wastes.

Man has only recently come to realize the finite limitations of the coastal zone as a place to live, work, and play and as a source of valuable resources. This realization has come along with overcrowding, overdevelopment in some areas, and destruction of valuable resources by misuse of this unique environment.

Only if we know the qualities of soils and geology can we evaluate their effect on use. The following soil and geologic qualities singly or in combination with others commonly affect uses:

> Soil drainage is significant to almost every soil use. The soils that flood now are those alluvial soils along streams that were deposited by flooding in centuries past. These soils are better suited as parks, recreation areas, or even farms if flooding does not occur while crops are growing.
>
> Soils which are wet much of the year pose many problems. If the water table in a soil rises near the surface some time during the year, a septic tank filter field will not function properly during that time. Such a soil is not suitable for houses with basements, and platform foundations built on it may be unstable.
>
> Wet soils freeze in cold climates. If these soils are used under driveways or paved roads, the concrete may heave up and break.
>
> Capacity of the land to bear loads is important in many kinds of construction. Organic soils -- peat and muck -- are poor sites for construction because they have exceedingly low capacities to support loads. Soils that contain unstable clays swell when wet and shrink when dry. Buildings and underground pipelines may shift and break.
>
> Suitability of soils on slopes may affect many kinds of construction. With certain hydrologic conditions, slippage may occur causing extensive damage to any structural development.
>
> Depth of soil and depth to bedrock can pose serious problems. Shallow soils make landscaping a serious problem. Bedrock near the surface makes utility installations difficult.

susceptibility of a soil to runoff and erosion must be determined. Runoff water may erode the soils and cut gullies. Sediments fill basements of partially built houses, washes out streets, damages newly dug or filled areas, clogs ditches and culverts along roads, and fills lakes or ponds with silt.

Purpose of Study

A geology and soil study is an important part of the Central New York Coastal Zone Management Program. It will help in making wise choices among alternative uses and assist in resisting pressures from those who have short term objectives or are poorly informed. The soil map can be interpreted to show the soils that are good sites for roads, private dwellings, septic fields, commercial areas, recreational areas, and other facilities.

Scope of Study and Study Area

This memo provides a general discussion of coastal geologic characteristics and more detailed soil characteristics. We have isolated the various soil associations found in the coastal zone. These associations show only the main patterns of different kinds of soil as they occur in large segments of the landscape. With such information, one can pick out large areas of soils subject to flooding or of questionable suitability for sewage disposal or foundations. They are useful for broad general planning purposes.

No attempt has been made to sample or field study soils. This report relies on soil information from the St. Lawrence/Eastern Ontario Commission, the SCS Soil Study of Cayuga County, the SCS Interim Soil Survey Report of Oswego County, and Soil Interpretation, Central New York Regional Planning and Development Board, 1969.

This report documents soils descriptions and interpretations for sample land uses in the coastal zone. Each soil is described, followed by comments on its particular features. Interpretative tables are included to suggest degrees of suitability for various land uses.

Subsequent work will entail construction of detailed soil maps of the coastal zone at a scale of 4 inches to the mile during Phase II of the Coastal Zone Management Program. These maps will separate different kinds of soils in areas as small as one or two acres. The delineations on a survey of this kind reflect differences in soil texture, structure, acidity or alkalinity, thickness, permeability, moisture capacity, and many other properties significant in planning. These studies would be suitable for operational planning.

The memo proposes a methodology for describing coastal soil suitability for various types of activities and land uses, and for describing soil capability for such activities and uses given the application of certain management techniques. A small area in the Towns of Sandy Creek and Richland is used as an example of this methodology.

COASTAL GEOLOGY

Historical Geology

The coastal zone lies in a region of unique geologic importance. The coastal zone, as well as most of New York State, has undergone long periods of inundation by warm shallow seas. This resulted in extensive sediment deposition which became consolidated basement strata.

Precambrian rocks lie deep within the earth below the coastal zone. They are exposed in the Shield areas of Canada and the Adirondack Mountains. Millions of years of heat and pressure have metamorphosed these rocks into their present dense, highly crystalline character. Examples of such rocks include gneisses and quartzite from recrystallized sandstone, and marble from recrystallized limestone. They are visible in areas where the overburden has been eroded away.

Paleozoic rocks are present throughout the coastal zone. Being sedimentary in origin, they are dissimilar to the Precambrians. This difference is probably the most significant geologic contrast existing anywhere within the Great Lakes Basin. The sedimentary rocks formed from 570 to 345 million years ago, as sediments were deposited on the shallow sea bottom which covered most of New York State. Ordovician rocks formed 500 to 435 million years ago, and consist of limestone (sedimentary calcium carbonate), sandstone, and shale (from mud deposits). They are found along the Eastern Lake Ontario coast, Tug Hill Plateau, and Southern Lake Ontario coast. Silurian deposits (aged 435 to 395 million years) contain shales and dolomite in bands running east to west from south of Fulton to just south of Syracuse. In the Syracuse area, salt domes are found within the well known Salina shales. The salt domes are believed to be precipitated from seawater during Silurian times.

After a long period of inundation and sediment deposition, the sea receded as the land uplifted. Stratified sedimentary beds tilted and were exposed to stream erosion as the eastern United States rose above sea level. The Adirondacks were uplifted at this time but at a much faster rate than the adjacent lands. Stream erosion became the major geologic influence shaping the topography. At this time, sedimentary materials were eroded from parts of the Adirondacks, exposing Precambrian gneisses, quartzites, and marbles.

Approximately 1 million years ago the first glacial ice sheets moved down over most of North America. The glaciers have had the most profound influence in shaping coastal zone topography throughout the formation of the Lake Ontario basin. In preglacial times, the lake was a lowland area occupied by large streams, which eroded weaker sedimentary rock by fluvial denudation. During the four glacier advances and retreats, weaker sedimentary rocks were eroded away, plucked up, and deposited in huge terminal ground morraines south of Syracuse. The basin was gouged deeper with each successive advance, exposing Ordovician limestone, shales, and sandstone in the northern coastal zone and Silurian shales in the south. As the last glacier retreated, a marginal lake was formed between the Onondaga limestone escarpment at Syracuse and the southern margin of the melting ice sheet.

Lake Iroquois, which included all of present day Lake Ontario, Oneida Lake, Cayuga Lake, and surrounding coastal lowlands was underlain by the Ordovician rocks exposed by a now receding glacier.

Lake Iroquois drained eastward by way of the Mohawk Valley. As the glacier retreated further north, the basin was invaded by the St. Lawrence Estuary, essentially a flooding of the St. Lawrence Valley. Following this, the land was uplifted for the last time. The St. Lawrence estuary retreated to its present level. The eutrophic remnants of Lake Iroquois became a series of isolated wetlands along the coast of post-glacial Lake Ontario.

Mineral Resources

The coastal zone is limited in mineral resources. There are some outcroppings of sandstone which have not yet been tested for use as concrete aggregate. Due to the limited number of large exposures, quarrying operations are not feasible at this time. Shale is present but its use as a building stone is not particularly popular locally. Red shale and sandstone were used as a dimension stone in the last century but quarries have been abandoned. Natural gas fields in the coastal zone have been abandoned. There are some sand and gravel pits whose origin stems from wave and current action on islands and submerged mounds in ancient Lake Iroquois. There are no other significant resources.

Erosion Areas

The coastal zone is located adjacent to Lake Ontario in such a way that it receives the maximum fetch as the prevailing westerlies move over the Lake's major axis. Shoreline erosion will be greater here than anywhere else on Lake Ontario.

Shoreline Processes

A very common occurrence along the coastal zone is the presence of barrier beaches, baymouth bars, spits, and sandbars. They sometimes completely close off a bay from the main body of the lake producing a blind bay such as that of Blind Sodus Bay or Ramona Beach Marsh. They are formed by the same geologic process. Waves approach a beach diagonally and breakers are refracted by the shoreline resulting in an almost oblique wave striking the beach. The swell current driven by winds and waves is thus broken into two components upon striking the beach. One component follows the path of the refracted breakers and strikes the beach perpendicularly. The other component runs parallel to the beach and is termed a longshore current. Littoral drift results as the current picks up bottom sediment and carries it parallel to the shore. If the current encounters an irregularity in the shoreline such as a bay, the waves will no longer break and the parallel component of the swell current will be weakened. The current then drops its load, building a spit across the bay. The longshore current is forced to bend according to the shoreline characteristics and as it does this it looses some velocity and load carrying capacity. It will have a swirling action as it bends around and into the bay, depositing its sediment in an elongated, shoreward bending direction. Such spits either seal off the bay completely or leave an opening; in effect the bay becomes a sheltered harbor.

Beach erosion is another important factor affecting the coastal zone. On the leeward side of Lake Ontario's enormous fetch, erosion is bound to be quite

extensive. Since most of the overburden consists of unconsolidated glacial till, it is easily eroded by the striking force of large waves breaking on the beach. Eroded sediment is carried lakeward by a backwash current (sometimes called a rip current) and deposited well offshore. Centuries of this action results in formation of cliffs in some areas where rock is more resistant and severely eroded shorelines in areas of unconsolidated material.

Industrial, transportation, and residential construction often represent a very drastic intrusion into the natural environment. Such an intrusion causes unfavorable consequences, particularly when it is not sufficiently adjusted to various geologic factors, or when it disturbs the biologic equilibrium. In fact, some areas actually become devastated.

In general, coarse-grained, well-drained, compacted materials have the most favorable engineering characteristics, whereas very fine grained, poorly drained materials have the least favorable characteristics. Other characteristics that warrant consideration in planning construction include the bearing strength, plasticity, frost heaving potential, and shrink-swell potential of materials. Other soil related characteristics must also be considered such as: angle of slope, flood potential, depth to water table, and availability of aggregate and borrow material. Very unfavorable areas for construction are found in the coastal zone in the sandy, peat and muck, and alluvial areas, in which the materials are highly compressible and unstable and have high water tables.

Although the Ontario shore is one of the more scenic tracts in New York State, it is subject to storm waves and severe erosion which periodically cause damage along the lake front. At times, installations near the shore are destroyed or so threatened that their continued use or occupancy may be dangerous.

Damage along the shore is very severe near bluffs. Here during high lake levels, storm waves attack the base of the bluff, wetting and removing large masses of unconsolidated till. Undercutting of the bluff in this manner causes landslides of both large and small dimensions because the undercut -- upper portions of the bluffs -- slide into the lake, carrying with them trees and any structures that are situated too close to the bluff's outer edge.

We may attempt to apply various management practices to lessen the geologic limitations. However, these practices generally require severe and expensive engineering and are of questionable long range usefulness. A basic knowledge of geologic conditions for management purposes must accompany any land use considerations. True management requires a recognition of the close relationships between resources and land uses.

COASTAL SOILS ASSOCIATIONS

(Note: Appendix 2 provides a listing of Soils associations and a map showing location in the coastal zone.)

Cayuga County-Williamson-Ira Association

The section of Lake Ontario shoreline in Cayuga County, extending from the Wayne County border east to the mouth of Nine Mile Creek, is dominated by the Williamson-Ira soils association. This association extends approximately one and one-half miles inland to the town of Fair Haven where there exists an area to the south, of the Sodus-Ira soils association. Proceeding east toward Nine Mile Creek, the Williamson-Ira association narrows to roughly one-half mile until termination. The neighboring soils are of the Sodus-Ira association.

The Williamson-Ira association is characterized by deep, moderately well-drained soils that have a fragipan. Williamson soils formed in silty, lake-laid deposits. Ira soils formed in glacial till in the mounds and hills and are at slightly higher elevations than the surrounding Williamson soils. The dominate soils are susceptible to serious erosion by both wind and water.

Areas bordering the lake are used for fruit production, although requiring extensive drainage for satisfactory results. In some areas further from the lake, agricultural use is in the form of dairy farms and to a lesser extent cash crops. The soils taken in aggregate have several characteristics which make them suitable for industrial and residential sites, although specific sites may be unsuitable. The relief is mild, and drainage is moderately good.

Features of this soil series which impose restraints on engineering considerations include a seasonally high water table with cut slopes subject to seepage and sloughing. The subgrade is subject to differential frost heave. Williamson dominated areas exhibit low bearing capacity, with large settlements possible under heavy or vibratory loads. In those areas where the Ira series dominates, the bearing capacity is generally high with low compressibility and seepage.

Tolerance to demands imposed by development is generally moderate in the Williamson-Ira soils association. Severe limitations exist for use of septic-tank effluent disposal systems due to moderately slow or slow permeability combined with seasonal wetness. Moderate limitations exist on homesite use, streets, and parking lots as a result of seasonal wetness and slope. Similar restraints impose severe limitations on sanitary landfills.

Other types of uses which require less extensive service structures, such as campsites, paths and trails, and picnic areas, may encounter slight to severe limitations depending on the degree of slope and extent of gravel and stones.

Soil series of particular note are the Lake Beaches and the Aurora, Farmington, and Benson series. The Lake Beaches are a miscellaneous land type composed of

gravel beaches and bars built up by wave action, and consisting of washed sand and gravel. This series is suitable for recreation and, with appropriate management practices, as a source of sand and gravel. A few of the older or higher beaches no longer subject to normal wave action are sites for temporary cottages and camping.

The Aurora, Farmington, and Benson series are in deep gorges formed by hydrologic erosion of various kinds of bedrock. The series is chiefly characterized by 20 to 70 per cent slopes and is susceptable to erosion which limits usefulness as forest, wildlife habitat, or recreation sites. They form, with Lake Beaches, the greater part of the Lake Ontario shoreline in Cayuga County.

Cayuga County-Sodus-Ira Association

The second dominate soil association within the coastal zone in Cayuga County is the Sodus-Ira soils association. It occupies those areas to the south of the town of Fair Haven and south and east of the mouth of Nine Mile Creek. The Sodus-Ira soils association is dominated by deep, well-drained and moderately well-drained soils with a medium textured to moderately coarse fragipan. These are low-lime soils developed on glacial till. The association includes a range of nearly level to steeply sloping soils on drumlins and of rolling soils on till plains, interspersed with lower lying soils that formed in the lake-laid deposits.

Stones interfere with the use of farm machinery in most areas, making intensive crop farming difficult. Dairying is the principle agricultural enterprise on this association. Cash crops are grown on the stone-free, more nearly level soils. As with the Williamson-Ira soils association, the favorable climate in the vicinity of Lake Ontario has encouraged the establishment of fruit production pursuant to necessary draining of seasonal surface waters. The moderate to steep slopes limit the use of the better drained soils for crops, and wetness limits the use of the more nearly level soils. Intensive measures are needed to control erosion if the steep side slopes of drumlins are cultivated. Strongly rolling topography and seasonal wetness are among major limitations for industrial and residential developments.

The area that extends for approximately one mile along Lake Ontario is used predominantly for cottages and campsites. Storm-wave action has caused active erosion of many of the drumlins and higher areas along the shoreline. Consequently, the use of such areas as sites for cottages is hazardous.

Properties of these soils as they relate to selected engineering purposes include stony soils with excess seepage and erodible steep slopes, and in places, a seasonal high water table. The Sodus-Ira association exhibits adequate strength for high embankments, with Sodus soils containing occasional lenses of pervious sand and gravel. Building foundation capability includes high bearing capacity and low compressibility with seasonal seepage on moderately steep to steep slopes.

Restrictions on selected non-farm uses in this soils association include limitations on septic-tank effluent disposal due to moderately slow or slow permeability and, where present, slopes in excess of fourteen per cent. Moderate

to severe restrictions may exist on homesites due to seasonal wetness and slopes. Other non-farm uses such as streets and parking, athletic fields and campsites experience restrictions on suitability due to slope of Sodus soils and stones in some Ira soils.

The major concern with respect to terrain degradation is erosion of the steep slopes of certain Sodus soils. These soils are generally found on the sides of drumlins which include those areas along the Lake Ontario shore line known as "the bluffs". The slopes are in excess of fourteen per cent, causing the soils to lose considerable amounts of water through rapid run-off. Due to difficulty in working these soils and the serious hazard of erosion, much of the acreage with these characteristics should be left in permanent grass or trees.

Oswego County-Sodus-Ira Soils Association

This soils association is a continuation of the Sodus-Ira association in the northeastern corner of Cayuga County. It extends along the Lake Ontario shoreline from the Cayuga-Oswego County line, through the city of Oswego, east to termination on the shoreline approximately one and one-half miles west of the mouth of the Little Salmon river. Along this area, the Sodus-Ira soils association encompasses all areas enclosed within the coastal zone boundary. Along the shoreline are several areas of freshwater marsh, while inland there exist scattered areas of the Scriba-Ira soils association.

The deep, well-drained Sodus soils occupy the upper areas of drumlin formations and the gently to moderately sloping areas of till plains. Sodus soils have 1½ to 2 feet of moderately permeable, gravelly or stony loam or sandy loam over a dense, firm to very firm, slowly to very slowly permeable, gravelly or stony fine sandy loam or loam fragipan that is 2 to 3½ feet thick. This fragipan rests on dense, firm to very firm, gravelly, or stony sandy loam or loam glacial till.

The deep, moderately well drained Ira soils occupy convex nearly level to moderately steep parts of drumlins and nearly level to sloping areas of till plains. Ira soils have 1½ to 2 feet of moderately permeable gravelly, cobbly, or stony fine sandy loam or loam over a dense, extremely firm, very slowly permeable, gravelly, cobbly or stony loam or fine sandy loam fragipan that is 1½ to 3 feet thick. This fragipan rests on glacial till similar to that underlying Sodus soils.

Principle agricultural activity is in the form of dairying with secondary activity in fruit production. High levels of residential and industrial activity are limited to the City of Oswego and the Nine Mile Point Niagara Mohawk atomic power plant located approximately one mile east of the hamlet of Lakeview. Generally, land use along the shoreline, excluding the City of Oswego, is either vacant or used for scattered residential sites.

Limitations within this soils association on agricultural activity include topography, acidity, low fertility, dense fragipans that limit rooting and cause wetness problems, and stoniness. The soils have poor groundwater supplies for irrigation.

Limitations on residential and industrial development are for the most part in the form of seasonal wetness and poor permeability which restrict on-site sewage disposal. These soils have generally good water disposal and properties for foundation support and highway construction. Slopes in cuts and fills are generally stable.

Terrain variation in the form of drumlins to the west of the City of Oswego may make them suitable for recreation development within restraints imposed by slopes and possibility of erosion. To the east of the city of Oswego, the terrain exhibits less variation and consequently contains somewhat less recreation value. However, restraints due to previously mentioned soils characteristics are found.

Oswego County-Minoa-Lamson-Canandaigua Association

The Minoa-Lamson-Canandaigua (MLC) soils association extends east from the termination of the Sodus-Ira association to the mouth of the Salmon River and inland to the limit of the coastal zone. Two other areas in which the MLC association occurs within the coastal zone are located in the northwestern corner of the county. One is an irregular shaped area of about six square miles east of the village of Pulaski. The second area is immediately west of the village of Sandy Creek and also encompasses about six square miles of land.

These soils are generally characterized as deep, moderately well to poorly drained, medium and fine textured, nearly level to gently sloping soils free of stones and gravel on glacial lake deposits. The topography of this association is nearly level to gently sloping with a few short, steep slopes in areas dissected by streams. Certain areas of the soils are wet, and in about 65 percent of them soils are sandy; about 30 percent of the areas have clayey soils. Many of the sandy areas have beds of clay at depths of 5 to 10 feet; depth of sand over clay is shallower near the clayey soils. Groundwater aquifers are generally poor in the clay beds.

Principle agricultural activity is in the form of dairy farming. The farms range from medium to large in size. Chief limitation of the soils with respect to agriculture is presented by high water tables.

The high water tables which are prevalent in MLC soils associations impose severe limitations on most urban uses. In areas with high water tables, disposal of septic tank effluent is difficult. The sands have fair grading characteristics, but the clays are difficult to work when wet. Foundation bearing strength is poor. Some slopes slump in cuts and fills. Frost heaving and seepage impose problems in highway construction. Lack of suitable drainage outlets and variable depths to clay are sources of problems in some areas of the association.

Oswego County-Alton-Windsor-Colonie Association

The Alton-Windsor-Colonie (AWC) soils association occurs as an irregular formation along the eastern boundary of the coastal zone from the town of Altmar northeast to the town of Richland. AWC soils are well to excessively drained, coarse and moderately coarse textured, nearly level to undulating soils formed in sand or stratified sand and gravel deposits.

The gravelly Alton soils and sandy Windsor soils occur where glacial meltwater washed materials out beyond the glacier and deposited the material to form outwash plains that were subsequently dissected to form broad, nearly level outwash terraces. The sandy Colonie soils have formed where glacial meltwater streams entered glacial lakes and dropped their load of sand.

Principle agricultural use is in the form of medium to large dairy or livestock farms located in the area north of the town of Altmar, constituting the greatest single use category within this area of the AWC association. Localized areas of wet soils within the AWC association limit some agricultural operations. These wet, sandy soils can be drained if a suitable outlet is available. The Alton soils are suited to well-suited for corn and alfalfa but poor to fair for vegetables.

Properties of the AWC association as they relate to engineering purposes are generally favorable. This association has good grading and excavating characteristics, and bedrock is seldom encountered during such activity. Slopes in cuts and fills are not difficult to stabilize although a water erosion hazard may exist if adequate vegetative cover is not maintained.

The coarse soil particles which occur in this association provide generally good yields for wells. They absorb rainfall readily and transmit the precipitation rapidly to aquifers. The same permeability characteristic aids in onsite sewage disposal. However, the rapid movement of sewage effluent through gravelly Alton soils raises the possible hazard of well-water contamination. Limitations on residential development are generally slight to moderate with degree of slope and stability the controlling factors. Similar limitations exist on less intensive development such as play and picnic areas and campsites.

Oswego County-Ira-Sodus (IS) Soils Association

Those areas within the coastal zone that are dominated by the Ira-Sodus (IS) soil association are situated in the northwestern corner of Oswego County. They are bounded on the west by Lake Ontario and extend from the Oswego-Jefferson County line south to the area of the Salmon River. The IS association is interspersed with areas of MLC and AWC soils associations and several areas of muck and peat.

IS soils are deep, well to moderately well drained, medium and moderately coarse textured, undulating and sloping soils on glacial till. The deep, moderately well drained Ira soils occupy convex nearly level to moderately steep parts of drumlins and nearly level to sloping areas of till plains where they may receive some runoff water from high Sodus soils. Both soils have fragipans 1½ to 3½ feet deep that are dense, firm to very firm, slowly to very slowly permeable, gravelly, cobbly, or stony fine sandy loam.

Principle agricultural use is in the form of medium size dairy or livestock farms. Several characteristics of this soils association limit extensive agricultural use. Among these limitations are seasonal wetness, stoniness, acidity, and slowly permeable fragipans.

Properties of these soils as they relate to engineering purposes include severe limitations on septic tank infiltration systems due to seasonal high water

tables and poor permeability. However, this soils association has high bearing capacity and low compressibility. Shrink-swell is very low to low. Depending on slope, some erosion by water action may occur.

Residential use is not limited by soil bearing capacity. However, poor permeability and poor to moderate groundwater supplies require ameliorative steps for extensive development. Less intensive use such as recreational development are limited by slope, gravel and stone fragments, and slow permeability.

An area of particular note within this association are the lake beaches. They contain a mixture of sand, gravel, cobbles, and boulders. The beaches were deposited by waves, wind, or ice and are still subject to these forces. These areas are located on hummocky or dune-like ridges in narrow strips along the present shore of Lake Ontario. The beaches are usually less than 1/8 mile in width and are up to 40 feet above the present lake level. Characteristics of the beaches are too variable to rate but these along the Lake Ontario shore are exposed to extreme weathering conditions.

COASTAL SOILS SERIES

Adams Series

These are deep, well drained to excessively drained soils that occur on level through moderately steep slopes of deltas, outwash plains or beach ridges. These soils occur along the edges of the Tug Hill Plateau, north of Oneida Lake and west of the villages of Richland and Altmar. These soils developed on glaciofluvial sand.

The surface layer is dark brown, loamy fine sand that is 9 inches thick. The subsurface from 9 to 11 inches is pinkish gray loamy fine sand. The subsoil from 11 to 23 inches is strong brown and yellowish brown loamy fine sand. The substratum from 23 to 60 inches is pale brown loamy fine sand and grayish brown loamy sand.

Alluvial land

These soils are subject to frequent flooding and are highly unsuitable for farming or development. Some lands were cleared for pasture but have regressed to secondary growth, brush, and weeds. Other areas are wooded with willow, swamp elm, soft maple, sycamore, and other water tolerant trees. This soil type consists mostly of very recent alluvium adjacent to streams. For the most part, these deposits show little or no profile development.

During floods, the soil material is shifted from place to place. Some areas consist of stony or gravelly material, and others are free of coarse fragments. Drainage ranges from good to very poor within short distances. Small areas of soils that show profile development were included in mapping this land.

Most areas of Alluvial land are in the long narrow valleys of secondary streams on the uplands.

Alluvial land is flooded frequently and is poorly suited to farming. Many areas are wooded with willow, swamp elm, soft maple, sycamore, and other water-tolerant trees. Some cleared areas are in pasture, but most of these areas are reverting to brush and weeds. Flooding and the variable soil properties severely limit the use of this land type for most nonfarm purposes.

Alton Series

The Alton series consists of deep, well-drained to excessively drained soils that formed in medium lime glacial outwash and beach deposits derived mainly from sandstone. Much of the sandstone was red; as a result, the solum has a reddish color. These soils occur in northern Cayuga and Oswego counties. Scattered areas consist of gravel beach deposits that built up along the edge of post-glacial lakes. Many areas occur as narrow bands at the base of drumlins.

In cultivated fields, the plow layer is dark-brown gravelly sandy loam about 7 inches thick. The subsoil extends to a depth of about 63 inches. To a depth of about 28 inches, it is reddish-brown to dark reddish-brown, very friable gravelly sandy loam. Below this depth, it is brown to dark-brown, very friable

very gravelly sandy loam to gravelly loamy sand. The subsoil is strongly acid to medium acid. The substratum consists of calcareous, stratified sand and gravel. It is loose in the upper part but is cemented with secondary lime below a depth of 96 inches.

Alton–Hinckley

Alton soils lend themselves to urban development as they are well drained, stable and very deep to bedrock. In areas of sloping or rolling topography, scenic views promote aesthetic homesite development. Water percolates rapidly through these gravelly soils, providing excellent groundwater yields. There may be some danger of contamination by sewage effluent due to this rapid percolation rate. Alton soils are an excellent source of gravel for onsite or nearby construction of roads and urban dwellings.

Alton Williamson

Alton soils lend themselves to urban development as they are well drained, stable and very deep to bedrock. In areas of sloping or rolling topography, scenic views promote aesthetic homesite development. Water percolates rapidly through these gravelly soils, providing excellent groundwater yields. There may be some danger of contamination by sewage effluent from septic tanks due to the rapid percolation rate. Alton soils are an excellent source of gravel for onsite construction of roads and urban dwellings. Williamson soils are deep, finely textured and have fragipans. There is a definite drainage problem in these soils due to slow percolation and fragipans in low depressional areas. In sloping relief, soils show extensive erosion. They can be farmed, but extensive fertilization programs are needed in these naturally unfertile soils. They are best suited for pasture and forest. Urban development is not recommended unless soils are drained.

Amboy Series

These soils are deep, well drained, strongly acid, medium textured soils that formed in strongly acid silty and very fine sandy wind- or water-deposited material. They occupy distinctly convex undulating or rolling to strongly sloping or steep dissected areas of the uplands. Amboy soils have 1½ to 2 feet of moderately permeable very fine sandy loam to silt loam over a slowly permeable, fairly dense, silt loam or very fine sandy loam fragipan that is 2 to 2½ feet thick. This fragipan is underlain by silts and very fine sands.

Arkport Series

The Arkport series consists of deep, moderately coarse textured, well-drained to excessively drained soils that formed in sandy deposits. These soils have gently undulating to strongly rolling, convex slopes.

In a cultivated area, a typical profile has a plow layer of dark-brown fine sandy loam about 7 inches thick. This layer is underlain by a thin, brown, leached layer of fine to very fine sandy loam to a depth of 9 inches. The subsoil below consists of loose, brown loamy fine sand or very fine sand through which there are ½- to 2-inch bands of firm, reddish-brown fine to very fine sandy loam. The bands are roughly horizontal, but in some places they are s

to 10 inches apart, and in other places they merge. The substratum is dark-brown to very dark grayish-brown, loose sand and some gravel. It is at a depth of about 48 inches. The reaction of the subsoil and substratum is neutral.

AuGres Series

These soils are deep, somewhat poorly drained, strongly medium acid, coarse textured soils that formed in medium acid to neutral water-deposited sands. They occupy nearly level to slightly depressed places on outwash flats. AuGres soils have 1 foot of loamy fine sand over sands derived mainly from sandstone.

Beaches

Lake Beaches are used mainly for recreation or as sources of sand and gravel. Older beaches at higher elevations which are no longer subject to wave action and flooding are used for cottage development and camping. Beaches directly adjacent to Lake Ontario are subject to extensive wave action and erosion making construction or other forms of urban development impractical. Beaches (0 to 5 percent slopes) (Lb) is a miscellaneous land type made up of gravel beaches and bars built up by wave action along the shoreline of Lake Ontario. These beaches consist of washed sand and gravel and are subject to flooding by waves during storms. Only a few trees, such as willows, can get a temporary foothold.

Canandaigua Series

The Canandaigua series consists of poorly drained, medium-textured soils that formed in lake-deposited, calcareous to alkaline silt and very fine sand. These soils occur as level or depressional landforms in the lake plains. They are scattered over the northern half of Cayuga and Oswego Counties and in a few low depressions in the till plain in the southern half, mainly with soils of the Honeoye drainage sequence.

A typical profile in a cultivated area has a very dark gray to black silt loam plow layer about 9 inches thick. This layer is underlain by a 3-inch leached layer of very friable, light-gray silt loam that is mottled. The upper part of the subsoil is friable, light brownish-gray, mottled silt loam. At a depth of 19 inches, it merges with light-brown, mottled friable silt loam. The reaction of the subsoil ranges from neutral in the upper part to weakly calcareous in the lower part. The substratum of calcareous, stratified silt and very fine sand is at a depth of about 27 inches.

Canandaigua Niagara

This nearly level area of loamy soils is wet. Layers of silts and clays at depths of 5 to 10 feet beneath the soils keep the water level near the soil surface during wet seasons. Some parts of the area have been drained, but much more drainage is needed. Public sewer and water facilities are also needed in this area. Many septic tank failures in this area have been caused by the high water table; effluent from septic tanks on these poor soils for sewage disposal is a major problem for home development. Groundwater yields are low from the silty and clayey aquifers beneath the soils.

The soils could be used much more intensively to produce crops like vegetables, if the land were drained and irrigated. This land improvement, however, would require a large project beyond the current economic means of individual farmers.

Canandaigua-Niagara soils have severe limitations for most urban uses. They have fair to poor grading characteristics, fair to poor trafficability, poor foundation bearing strength, and are erodible in bare spots. Slopes in cuts and fills are subject to seepage; roads on these soils have problems of differential frost heaving. Ponds and small lakes are readily made in this soil area because holes quickly fill with water.

Colonie Series

The Colonie series consists of deep, well-drained to excessively drained soils derived from sandy deposits laid down by water, wind, or both. Many areas of these soils are on glaciofluvial terraces where, it is believed, sands deposited by fresh water were rearranged by wind. As a result the relief is rolling and undulating.

In a cultivated area, a typical profile has a 9-inch plow layer of brown to dark-brown loamy fine sand. The subsoil extends to a depth of 36 inches and consists of loose loamy fine sand that is mostly light yellowish brown to yellowish brown but has thin bands of strong brown. The bands are roughly horizontal in an intricate pattern. They alternate in color and are as much as 8 inches apart in some places, but they merge in other places. The substratum is strongly acid, very loose, light yellowish-brown loamy fine sand.

Colonie Arkport

Colonie-Arkport soils have variable slopes. Some places in this association have aesthetic topographic variations for homesites while other areas do not. These sandy soils are well drained and wells drilled into aquifers beneath them are likely to give good yields. The soils are generally good for subsurface sewage disposal, but the fine sands have some tendency to seal with sewage disposal systems with adequate amounts of gravel around the tile lines will overcome this limitation.

Excavations in Colonie-Arkport soils can be made without difficulty and with little danger of encountering bedrock. Slopes in cuts and fills are fairly stable; trafficability is good when the sands are moist, but poor in spots where the soil is very dry. Best lawn and landscaping growth on these soils requires addition of fertile topsoil. The Colonie-Arkport soils have good potential for sprinkler irrigation on intensive agricultural crops such as vegetables. The finer textured bands give the subsoils better water holding capacity for crops than do subsoils without bands in coarser textured materials. Wind and water erosion is a problem on these soils if adequate vegetative cover is not maintained.

About 25 percent of the area of this sandy association is occupied in some places by contrasting clayey Schoharie, Odessa, and Lakemont soils that generally occupy basins or lower areas. Interpretations for soil use of these small spots are similar to those described for the Schoharie-Odessa soil association. In many cases the contrasting soils complement each other for specific developments. For example, wet Lakemont soils are good pond sites that

are especially valuable next to well drained Arkport and Colonie soils for aesthetic homesite development. In these areas where clays and sands are adjacent, clays underlie the sands at shallower depths than in the rest of the areas of this association.

Colonie Windsor

Colonie Windsor soils are good for most kinds of development. They are deep, well drained, and sandy, readily transmitting water. Groundwater yields from wells drilled in these soils are excellent. Septic tank effluent and percolation are excellent. In steeper sloping areas erosion by water can be a problem if vegetation is removed. Winds can also shift these sandy soils into dunes if vegetation is not present for stability. The soil is suitable for highway construction and all kinds of urban development. Extensive fertilization programs are necessary if farming is to be profitable. A loamy topsoil should be added from an alluvial source for best landscaping results.

Fresh water marsh

This is a miscellaneous land type consisting of shallow inundated areas around lakes and of shallow ponded areas in uplands. The most extensive areas of freshwater marsh border the Lake Ontario coast. Some of the ponded areas are natural, some are man-made, and some have formed as a result of beaver dams. They are covered with water most of the year and commonly are too wet to support trees, except along the edges where the soil builds up, but they support a dense growth of coarse marsh plants. In many areas the growth is mostly cattail flags; in others it is low, water-loving shrubs.

These marshes are good habitat for muskrat, other aquatic animals, and waterfowl. Some of the cattail flags are harvested for caulking material. The harvesting operations, properly managed, open up the areas and benefit wildlife.

Hinckley Series

These are deep, excessively drained soils formed in glacial outwash, kame terraces, beaches, and eskers on nearly level to sloping and complex sloping relief. Individual areas are irregular in shape and range in size from 2 to 40 acres.

The surface soil typically is dark grayish brown gravelly loamy sand 7 inches thick. The upper part of the subsoil from 7 to 21 inches is dark brown gravelly loamy sand. The lower part of the subsoil from 21 to 33 inches is dark yellowish brown very gravelly loamy sand. The substratum from 33 to 62 inches is dark gray very gravelly loamy sand.

Ira Series

The Ira series consists of deep, moderately well drained low-lime soils that have a fragipan. These soils formed in medium-textured, neutral to weakly calcareous till, derived mainly from sandstone. Much of the sandstone is red (Medina and Oswego sandstone) and imparts a reddish hue to the soil. A minor amount of limestone or lime-bearing strata of sandstone has contributed a small quantity of lime, yet limetone fragments and gravel are rarely found. There is a conspicuous amount of quartzite, gneiss, granite, and other kinds of gravel and stones.

Ira soils are in the extreme northern part of Oswego County. Their southern boundary is an east-west line running through Ira Hill to Westbury. Along this line there are outcrops of Lockport dolomite (limestone), and the till abruptly increases in lime content. As a result there is an abrupt change from the acid Ira soils to the high-lime Hilton soils. About a mile north of this line, Ira soils take on a slightly higher clay content, apparently from the Rochester shale which outcrops in this area.

A typical profile in a cultivated area has a very dark grayish-brown to dark-brown gravelly loam plow layer about 7 inches thick. The next layer is the upper part of the subsoil. It is about 10 inches thick and consists of yellowish-brown to brown, very friable gravelly loam that is faintly mottled in the lower part. Just below is a 4-inch leached layer of very pale brown, mottled gravelly fine sandy loam that is very friable. It is underlain by the lower part of the subsoil, which is a very firm, dense fragipan. The upper part of the fragipan is brown to dark-brown, mottled gravelly loam. The lower part, below a depth of 34 inches, is brown mottled gravelly sandy loam. The fragipan is medium acid to neutral with a medium acid reaction above the fragipan.

Ira Sodus and Sodus Ira

In these soil associations, dairying is the principle land use while farming is somewhat limited. These soils have serious limitations for agriculture purposes due to low fertility, acidity, stoniness, and dense fragipans which cause wetness and rooting problems. Also, groundwater resources are limited. Urban development is economically feasible, the principle problem being that of on-site septic tank effluent limitations. Municipal sewer lines could be installed for cluster developments at a reasonable cost. There is excellent potential for highway development and soils provide good foundation support. Scenic areas could be developed where topographic variations in soils lend themselves to such uses. These soils are excellent for building water impoundments to serve both hydrologic and aesthetic purposes.

Lamson Series

The Lamson series consists of deep, poorly drained to very poorly drained soils that formed in fine and very fine sand deposits of glacial lakes. Many of the wettest sites have a mucky fine sandy loam surface layer. These soils are not extensive and occur in isolated patches with Niagara and Minoa soils.

A typical profile in a cultivated area has a black to very dark brown fine sandy loam plow layer about 9 inches thick. The next layer is leached, gray to grayish-brown loamy very fine sand to very fine sandy loam that is faintly mottled. It is very friable and extends to a depth of about 21 inches. The underlying subsoil is 21 inches thick or more. The top 7 inches consists of an irregularly shaped mass of brown, very friable, mottled very fine sandy loam 4 to 6 inches in diameter. This mass is surrounded by pale-brown, loose loamy very fine sand that is faintly mottled. The lower part of the subsoil is yellowish-brown, very friable to loose loamy fine sand to loamy very fine sand that is faintly mottled. The reaction is slightly acid throughout the profile.

Lamson Minoa

These soils are usually level and wet. Lamson soils are fine to very fine textured and poor to very poorly drained. Minoa soils are coarser, poorly drained, and contain stratified bands or lenses of calcareous silt. The water

table in this association is extremely high year round and depth to bedrock is 5 to 10 feet. Urban development and subsurface sewage disposal is virtually impossible without extensive drainage projects and addition of fill to low spots. The soil cannot support building foundations, slumps or collapses in cuts and fills, and contains clays which are difficult to work when wet. Furthermore, frost heaving and seepage are problems for highway construction.

Lamson Niagara

Lamson soils are silty and poorly drained. Niagara soils have high clay content, slow percolation, and are located in gently sloping to flat topography. They are deep, silty, and somewhat poorly drained. This association has severe limitations for urban uses. Flat, monotonous topography has poor groundwater resources, slow percolation for septic tanks and low bearing capacity for building foundations. Soils are subject to frost heaving, and clays are difficult to work with when constructing highways. In sloping areas, rapid runoff from these slowly permeable soils is another problem for urban construction. Agriculture is not extensive due to the wetness and low fertility. These soils are best left for pasture and forest.

Madalin Series

The Madalin series consists of deep, poorly drained soils that formed in calcareous gray lacustrine clay and silty clay. These soils occupy low, level, or depressional areas, commonly between drumlins, on the lake plain.

A typical profile in a cultivated area has a black to very dark brown heavy silt loam plow layer about 8 inches thick. Just below this layer is the subsoil that extends to a depth of about 36 inches. The upper part of it is firm, grayish-brown to dark grayish-brown, mottled silty clay loam to silty clay. The part below a depth of 30 inches is firm, dark grayish-brown, mottled silty clay loam that contains thin layers of very fine sandy loam. The reaction of the subsoil grades from neutral to weakly calcareous with depth. The substratum consists of very firm, grayish-brown to brown, mottled silty clay loam that contains thin layers of gray very fine sandy loam or coarse silt loam. It is strongly calcareous.

Mardin Series

Mardin soils are deep, well to moderately well drained, occupying slightly convex, gently to moderately steep slopes where large amounts of water cannot accumulate. They consist of 1¼ to 2 feet of moderately permeable channery silt loam over a dense, firm, very slowly permeable channery silt loam fragipan that extends to a depth of 4 to 5 feet.

Minoa Series

The Minoa series consists of deep, somewhat poorly drained, moderately coarse textured soils that formed in alkaline to calcareous fine sand. In places the sand is stratified with bands or lenses of calcareous silt and very thin bands of clay. The sand was deposited as lacustrine or eolian material or as gravel-free deltaic sand. Minoa soils are in moderately low areas or medium depressions scattered on the lake plain and between drumlins.

A typical profile in a cultivated area has a very dark grayish-brown fine sandy loam plow layer about 8 inches thick. This layer is underlain by a very friable, leached layer of light yellowish-brown to brownish-yellow fine sandy loam that is faintly mottled. The subsoil is at a depth of about 12 inches. The upper part of it is very friable, brown to pale-brown, mottled fine sandy loam. The part below a depth of 27 inches is very friable to loose, brown to dark-brown loamy sand or loamy fine sand that is distinctly mottled. The reaction of the sub-soil is neutral to mildly alkaline. The substratum is at a depth of 35 inches and consists of light brownish-gray, mottled layers of sand, fine sand, and silt. It is weakly calcareous.

Minoa Niagara

Minoa soils are deep, moderately coarse and somewhat poorly drained, located on level lake plains and low spots between drumlins. Niagara soils are extremely fine textured and poorly drained, and also located on level land. The soils are unsuitable for urban use due to slow percolation, poor foundation bearing strength, limited groundwater supplies and extreme difficulty in working the soils when wet. Highway construction is difficult because of frost heaving and presence of clays. Agriculture is possible, with addition of fertilizer and proper drainage installations.

Minoa Rumney

They are deep, usually wet, poorly drained, subject to frequent flooding and have slow percolation rates. Farming would be possible if fields could be drained and flooding controlled. Soils have poor foundation-bearing strength and subsurface sewage disposal is a severe limitation. These soils are unsuitable for urban development or highway construction.

Muck Peat Series

The Muck-Peat series consists of medium textured soils on alluvium, and organic soils.

There are 33 areas scattered throughout Oswego County. Most of the areas in Oswego County range in size from about ½ square mile to 2 square miles; the larger areas are about 7 square miles north of Toad Harbor, 3 square miles northeast of Phoenix, and 5 square miles west of Hastings. These areas are rounded or irregular in shape and have elevations ranging from about 300 to 1,300 feet with most of the areas less than 500 feet.

Organic deposits mark the location of basins or embayments in Lake Iroquois, depressions in the till plains, and kettles in outwash plains or terraces. After the glacial ice melted and glacial lakes receded, these sites were occupied by ponds or small lakes. The process of filling, in most cases, started with the formation of marl -- a mixture of calcite fragments, shells, and clay. In some places the accumulation of marl is several feet thick. The second stage of filling is the formation of peat, an accumulation of slightly decomposed or undecomposed plant parts. A swampy or water environment favors the preservation of organic material. The average rate of organic matter accumulation in peat soils has been estimated to be 0.0021 feet per year. Subsidence and oxidation loss is much greater than this when the organic soils are drained. Locally, in the absence of lime which is necessary for the formation of marl, the organic deposits may be underlain by clayey, silty, loamy, sandy, or gravelly

deposits. When the plant parts have decomposed to such an extent that they are unrecognizable, the material is Muck. Muck is black and Peat is commonly brown or dark reddish brown. Muck is the dominant deposit in the Syracuse area, but the amount of Peat in MP areas increases to the north. Also, in organic deposits that are thicker than about 3 feet, Muck is often underlain by Peat.

Muck and Peat soils occupy closed depressions, swamps, and bogs which are frequently the head areas of streams. The organic materials that make up the Muck and Peat soils are derived mostly from sedges, moss, reeds, cattails, rushes, and woody vegetation. Muck and Peat soils have 1½ to not more than 20 feet of organic deposits over marl or other mineral bottom deposits. Mineral deposits under Muck and Peat are generally similar in texture to the surrounding mineral soils.

The Muck-Peat association has about 60 percent of its area occupied by Muck soils, and 10 percent occupied by Peat. Soils of minor acreages include about 10 percent of the area in Lakemont soils, 10 percent in Palmyra soils, and 5 percent in Warners soils. The poorly drained, fine textured Lakemont soils formed in calcareous lake deposits and occupy nearly level areas in the lake plains along the margins of this association. The well drained, medium textured gravelly Palmyra soils occupy kames, which are associated with the Muck- and Peat-filled kettles on outwash plains and terraces. Very poorly drained, medium textured Warners soils formed in alluvial materials and occupy nearly level floodplains of streams that meander through Muck- and Peat-filled swamps and bogs.

Muck

Muck consists of organic soil forming in mixed woody and grassy or sedgy material. The organic material is generally more than 3 feet thick but is as thin as 1 foot in places. Muck is strongly acid to alkaline.

A typical profile has a very friable, black muck surface layer about 9 inches thick. Next is a layer of very friable, very dark brown muck grading to dark-brown and dark yellowish-brown, fibrous, peaty material. This layer extends to a depth of about 40 inches, and the lower part contains many partly decomposed wood fragments. The mucky layers are neutral in reaction. The mineral substratum is made up of layers of light-gray to white, weakly calcareous clay and silty clay.

Muck Peat

Areas of Muck-Peat soils have high water tables throughout the year where they have not been drained. In the past 10,000 years, since the glacier left the area, deposits up to 20 feet thick have accumulated in some places. Areas of Muck-Peat soils could be developed and used for intensive crops. Many areas of MP soils are currently forested and undeveloped. These soils are an extremely valuable potential resource for intensive food production in the future; many of the areas, however, need large drainage projects for amelioration. Clearing and stump removal operations are also very expensive.

Muck-Peat areas are poor for most urban development because of the high water levels and organic deposits. The organic materials in the MP areas have very poor foundation bearing strength. Buildings and roads that must be built in

these areas should have the organic materials dredged out and replaced with mineral fill trucked in from other places to give a stable base for foundations. This land treatment is extremely expensive. The MP areas are generally recognized as being best for agricultural use, or are left undeveloped if the economic situation does not justify clearing and draining them. In a few places these soils could be developed for wildlife preserves or lakes.

Niagara Series

The Niagara series consists of deep, somewhat poorly drained silty soils that formed in lake deposits high in content of silt and very fine sand. These soils are nearly level and have little runoff but receive some runoff from adjoining soils.

A typical profile in a cultivated area has a dark-gray to very dark gray silt loam to very fine sandy loam plow layer about 9 inches thick. This layer is underlain by a thin, leached layer of very friable, light brownish-gray to pale-brown very fine sandy loam that is distinctly mottled. The subsoil is at a depth of about 12 inches. It is firm, brown, distinctly mottled silt loam. The reaction grades from neutral in the upper part of the subsoil to weakly calcareous just above the substratum. The substratum is at a depth of about 35 inches and consists of layers of brown silt, very fine sandy loam, and loamy very fine sand that are distinctly mottled. The reaction of the substratum is strongly calcareous.

Palmyra Series

These soils are deep, well drained, medium textured gravelly soils that formed in high lime deposits of glacial outwash sand and gravel. They occupy nearly level valley floors where glacial rivers once ran, or hilly areas where meltwaters emerged from the glacier and deposited hills of gravel. Palmyra soils have 1 to 1½ feet of moderately to rapidly permeable gravelly loam over a moderately permeable zone of gravelly loam to clay loam that extends to a depth of 1½ to 2½ feet and tongues downward into very rapidly permeable stratified gravelly and sandy outwash dominated by fragments of limestone, sandstone, and shale.

Palmyra

Well drained, gravelly, nearly level Palmyra soils are probably the most valuable single land resource in the coastal zone. These soils are good for almost all urban and agricultural developments. This series occurs infrequently and in small areas in the eastern coastal zone.

Palmyra soils have good groundwater in gravelly aquifers beneath them; wells in these soil areas can yield more than 1,000 gallons a minute. Palmyra soils are good for septic tank effluent disposal if proper engineering designs are used to assure adequate filtration before seepage into groundwater aquifers.

Palmyra soils are easily excavated, deep (more than 100 feet in places) to bedrock, stable in cuts and fills, and have good trafficability and foundation support characteristics. The topsoil is fertile, but needs gravel removal for

best lawn growth and easiest mowing. About 25 percent of the Palmyra soils are gravelly and wet; about 10 percent are silty and wet. The wet areas have potential for development of ponds and lakes, but the water table fluctuates several feet from wet winters to dry summers. A few small areas of Palmyra soils, on steep hillsides, have potential for aesthetic homesite development with good valley views.

Rhinebeck Series

These soils are deep, somewhat poorly drained, medium acid to neutral, fine textured soils, free of coarse fragments. They occupy gently sloping areas once occupied by glacial lakes. Rhinebeck soils have 1 foot of moderately to slowly permeable fine silt loam over slowly permeable silty clay loam or silty clay that extends to a depth of 2 to 3 feet. This soil material is underlain by layers of lake-laid silty clay separated by thin silty layers.

Rhinebeck Madalin

The RM areas have flat monotonous topography, poor groundwater supplies, and are poor for subsurface sewage effluent disposal. The clayey soils have low bearing capacity for foundations, poor trafficability, and are highly subject to differential frost heaving. The clays will not support good plant growth where topsoil is removed.

Rhinebeck-Madalin soils are difficult to drain. At present, most of these areas support only poor agriculture. Farming could be much improved, however, with large drainage projects. The soils could be irrigated with very careful management, but irrigation water probably would have to be brought from other areas. Slow soil permeability and the long period of wetness after water application are the main deterrents to irrigation.

Some drained areas are farmed, but most of this association is too wet or too stony to be well suited to farming.

Seasonal wetness is the main limitation if the dominant soils are used as sites for residential or industrial developments. The compact glacial till provides good bearing surface for structures, and the topography generally is favorable. There are severe limitations, however, if the soils are used as drainage fields for septic-tank effluent.

There is little demand for private development of recreational areas because of the proximity of Lake Ontario and State Parks at Fair Haven and Selkirk Shores. Nevertheless, the terrain is favorable for the development of golf courses and playing fields. Swampy areas, native woodland, and brushy idle land are desirable habitat for many kinds of wildlife. There may be a scarcity of some kinds of wildlife food because little of the association is used for grain or corn. Successful plantations can be established if suitable trees are selected for planting.

The glacial till underlying the major soils can be used for borrow material, hard fill, or subgrades, but it is likely to contain some large stones. Only a few small deposits of sand and gravel occur in this association. Topsoil

can be obtained from soils on the bottom lands of small streams. Although the surface layer of the other soils can be used for topsoil, this material is somewhat stony or gravelly.

Flooding occurs periodically along small streams but does little damage.

Rumney Series

These are deep, somewhat poorly drained soils. These soils developed in a wide variety of sediments along streams but sandstone sediments are dominant. Rumney soils occur in narrow strips on flood plains along rivers and streams throughout Cayuga and Oswego Counties. The streams have low gradient and are slow flowing. Individual areas are narrow and irregular in shape. They range from 3 to 15 acres in size.

The surface layer typically is dark grayish brown loam that is 8 inches thick. The upper subsoil from 8 to 30 inches is a grayish brown mottled loam. The substratum from 36 to 50 inches is a gray sandy loam.

Scarboro Series

These soils are deep, poorly drained, coarse textured, strongly acid soils that formed in stratified sandy or sandy and gravelly glacial outwash materials. They occupy nearly level areas or slight depressions on outwash terraces or deltaic deposits. Scarboro soils have ½ to 1 foot of rapidly permeable sandy loam or fine sandy loam, high in organic matter, over ½ to 1½ feet of rapidly permeable loamy sands or sands. This material rests on layers of sands or stratified sand and gravel.

Scriba Series

The Scriba series consists of deep, medium-textured, somewhat poorly drained soils that have a fragipan. These soils formed in neutral to weakly calcareous, medium-textured till derived mostly from red sandstone of the Medina and Oswego formations. The small content of lime is derived from small amounts of limestone or from lime-bearing strata of the sandstone. Limestone fragments are rare in these soils. There are conspicuous amounts of foreign stones, however, including quartzite, gneiss, and granite. Scriba soils are in the extreme northern part of the county.

A typical profile in a cultivated area has a very dark grayish-brown gravelly loam plow layer about 9 inches thick. Just below the plow layer is a slightly firm, leached layer of grayish-brown to brown gravelly fine sandy loam that is distinctly mottled. The subsoil is at a depth of 13 inches. It is a very firm, dense fragipan consisting of brown, distinctly mottled gravelly and stony fine sandy loam. The reaction is slightly acid from the surface layer through the upper part of the fragipan, or to a depth of about 30 inches. The lower part of the fragipan is neutral. The substratum of very firm, dense till is at a depth of 48 inches. It consists of calcareous brown, faintly mottled gravelly and stony fine sandy loam.

Sodus Series

The Sodus series consists of deep, medium-textured, well-drained soils that have a fragipan. These soils formed in neutral to weakly calcareous, medium-textured till. Red sandstone is prominent and is the main rock constituent

of the till, but there are conspicuous amounts of quartzite, gneiss, and granite in the form of gravel, cobbles, and boulders. Sodus soils occur frequently within the coastal zone interspersed with Ira soils. About a mile north of their southern boundary, these soils contain slightly more clay and shale.

A typical profile in a cultivated area has a dark grayish-brown gravelly loam plow layer about 7 inches thick. The upper subsoil extends to a depth of about 16 inches and is very friable, yellowish-brown gravelly very fine sandy loam. It is separated from the lower subsoil by a 4-inch, leached layer of firm, pale-brown gravelly very fine sandy loam. The lower subsoil is a very firm, dense fragipan. It grades from medium acid, brown gravelly loam in the upper part to slightly acid gravelly very fine sandy loam at a depth of about 30 inches. Equally dense till is at a depth of about 53 inches. It consists of dark-brown gravelly very fine sandy loam that grades from neutral in the upper part to calcareous below a depth of 73 inches.

Volusia Series

Volusia soils are deep, somewhat poorly drained, occupying long gentle slopes in positions where they receive runoff water from adjacent lands. These positions are generally above valley floors and adjacent to sloping valley sides. Soils have ½ to 1 foot of moderately permeable silt loam over a firm, dense, very slowly permeable, channery silt loam fragipan, what extends to a depth of 4 to 5 feet. This fragipan rests on firm, dense, channery silt loam glacial till.

Volusia Mardin

These soils contain fragipans which impose severe limitations on land use. Rooting depth and water permeability are restricted to the top one or two feet of soil. Septic tank percolation is poor; groundwater yields are low. Soils are deep to bedrock but tend to slough in cuts and fills. Foundation bearing strength is good in areas of glacial till and highways can be built if seepage and frost bearing problems can be solved by drainage installations.

Wallington Series

These soils are deep, somewhat poorly drained, strongly acid, medium textured soils that formed in wind- or water-deposited material high in silts and very fine sands. They occupy nearly level to gently sloping landscapes and a few spots in dissected areas of lake plains. Wallington soils have 1 to 1½ feet of moderately permeable, very fine sandy loam or silt loam over 2 to 4 feet of dense, firm to very firm, slowly or very slowly permeable very fine sandy loam or silt loam fragipan. This fragipan rests on strongly to medium acid stratified silts and very fine sands.

Wallington Niagara

Wallington soils are very fine textured and contain fragipans resulting in slow permeability and poor drainage in level areas. Niagara soils are very fine textured and poorly drained with slow, percolating rates. These soils have several limitations for urban use but can be drained. Soils will also respond to fertilizer applications for agriculture. Subsurface sewage disposal is a problem because of fragipans. The soils are deep to bedrock but have poor groundwater yields.

Williamson Series

The Williamson soils consist of deep, moderately well drained soil that contain a fragipan. They have formed in water or wind deposited silt and very fine sand and occur throughout the county except for the Tug Hill area. The Williamson soils have been influenced by glacial action in some local areas. They occur on level to sloping relief mostly in 2 to 15 acre parcels that are roughly circular or rectangular in shape. A few of the individual sloping areas occupy as much as 40 acres.

The surface layer typically is brown, very fine sandy loam that is 9 inches thick. The upper part of the subsoil from 9 to 20 inches is dark brown to light brownish gray very fine sandy loam that contains mottles in the bottom 3 inches. The lower part of the subsoil from 20 to 44 inches is a brown and dark reddish brown silt loam fragipan. The substratum from 44 to 50 inches is brown silt loam.

Williamson

Williamson soils are deep, finely textured with fragipans causing drainage and percolation problems. Farming is possible with application of fertilizer and drainage installations. Foundation bearing strength is fair and septic tank disposal is poor. Soils are wet and susceptible to heaving and seepage making highway construction difficult. In sloping areas, runoff water has cut gullies into easily erodable soil. Most slopes of Williamson soils are eroded.

Windsor Series

These soils are deep, excessively drained, strongly acid, coarse textured soils that have formed in deep sandy deposits on glacial outwash terraces. They occupy nearly level or gently rolling areas and, in a few places, steep slopes. Windsor soils have 2 to 2½ feet of rapidly permeable strongly to medium acid sand, loamy sand, or loamy fine sand over sand derived mainly from sandstone fragments.

A MANAGEMENT APPROACH TO SOIL LIMITATIONS

Soils in the coastal zone are extremely varied. Little spots of contrasting soils, in many places only a few hundred feet across, occupy nearly level to steep slopes, wet depressions or sandy areas, and areas shallow or deep to bedrock where the glacial mass left a confused series of deposits. Generalized soils maps and soils association maps show broad groups of soils types. These maps show major soil differences of geomorphic areas of about 300 acres or more.

Use of these maps provides a basic understanding of the soils and assists in anticipating problems that can occur based on soil limitations in a general area.

In order to effectively use soils information for coastal zone management, one must obtain detailed soils surveys. The most common detailed maps are those published by the United States Department of Agriculture. These new soils surveys superimpose the soil information on a series of air photos of the county and give soil delineation for small areas. The surveys also give information on the slope and the erosion category for each soil.

In using soils information to help guide development in the coastal zone, we must develop a rational approach to guide land use in accordance with soil properties. Deterioration in environmental quality often accompanies failure to recognize natural limitations. However, we also must realize that there are pressures for coastal development and try to make good decisions in locating uses.

Information on soil limitations provides an early warning system about the kinds of problems which may occur if a site is developed for a given use. For example, the soil may have a low bearing strength and is thus unable to support the weight of heavy building. The soil limitations may be overcome through proper building and development design. The more severe the limitation, the more costly it will be to design and construct a solution to the limitations problem.

Although the sensitive nature of the coastal zone precludes most extensive development, we must provide a useful tool to incorporate soil information in the planning process. One possibility is to provide soil use management practices keyed to development potential of soils for specific land uses. Using detailed soils surveys, one may determine limitations of specific soil types for each land use. It is then possible to show various management practices to determine to what extent each soil may be upgraded by the management practices. Even after the application of management practices, a soil may be so poorly suited to the particular use that no measure of management could improve it.

The RPDB believes that detailed soil surveys should be used to map limitations in the coastal area for each possible land use, accompanied by additional mapping showing the degree of upgrading which can result with the application of management practices. We believe this provides a realistic picture of the soils capability in the coastal zone and aids in the determination of land use policy.

Soils Descriptions

This section furnishes a brief description of each soil and miscellaneous land type (Appendix I) in the portions of Oswego and Cayuga Counties comprising the Coastal Zone. The mapping units included are described in the Interim Soil Survey Report of Oswego County and in the Soil Survey of Cayuga County. The following methodology was used to determine the development potential of soils listed in the Interpretive Tables for Soil Types in the Coastal Zone:

Slight	Well drained Not subject to flooding 8 percent slope Low potential frost action Deeper than 40 inches to bedrock .1 percent stoniness No exposed bedrock Good permeability Loamy texture
Moderate	Moderately well drained Not subject to flooding 8 to 15 percent slopes Moderate potential frost action Bedrock at 20 to 40 inches 3 Percent stoniness 10 percent rock outcrops Moderately permeable Gravelly textures
Severe	Poorly drained Seasonal wetness 15 to 25 percent slopes High potential frost action 3 to 15 percent slopes 10 to 50 percent stoniness Bedrock 20 inches deep Slowly permeable or rapid permeability Heavy clay or loosely sandy or very gravelly textures
Very Severe	Very poorly drained Flooding or ponding 25 percent slope 15 percent stoniness 50 percent rock outcrops Very slowly permeable or extremely rapid permeability Bedrock 20 inches deep Loose sand or organic material
Made Land	Units of soils too disturbed to consistently rate, onsite investigations should be made on an individual basis to determine the use potential. Most areas of these soils are in a permanent land use.

One must note, however, that even though a soil is rated as having certain limitations for various uses does not mean that it cannot be used for these purposes. If economics is not a consideration, many obstacles to use may be overcome to some degree. The development of soils having severe or very severe limitations will usually cost more money to upgrade than those with only moderate limitations.

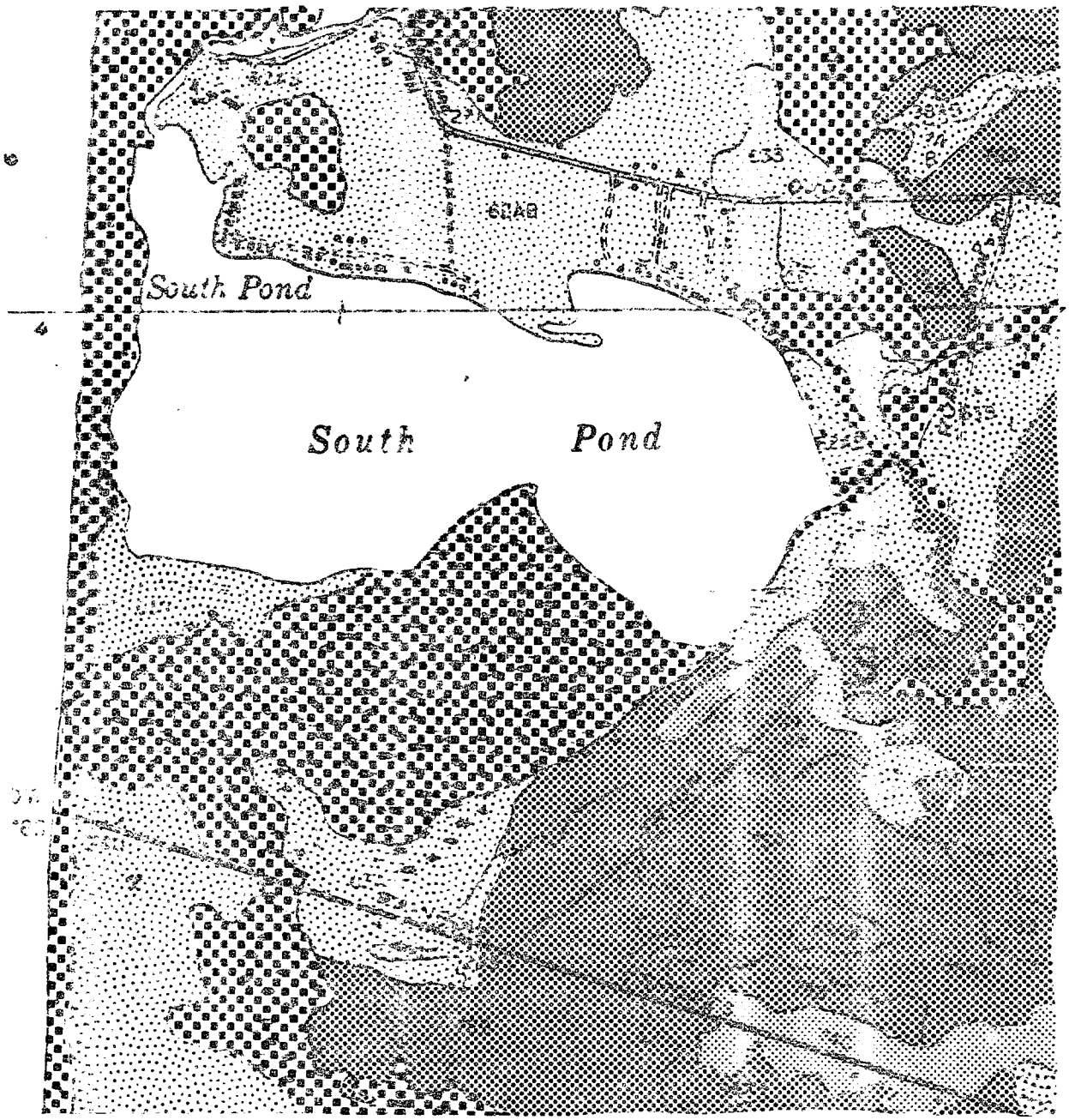
The St. Lawrence-Eastern Ontario Commission has furthered the concept of soil management through a system of identifying soil limitations before and after management practices. The following example shows how this system might be used in the Coastal Zone. Figures 1 and 2 delineate a small area in the Towns of Richland and Sandy Creek. Figure 1 shows the development potential of soils for structures without basements without management practices applied. Using Figure 3, one can identify the code numbers associated with each limitation and key it to Table 1, "Conventional Management Practices." If these practices are followed, soils can be upgraded to the limitations shown in Figure 2.

We can see that certain soil types remain severe or very severe even after such management practices are applied.

This methodology should not be used to necessarily justify development anywhere in which soils can be forced to sustain it. Clearly the soil suitability is only one of the many factors which must be taken into consideration when considering development. However, it may be a way to help recognize the development pressures facing the coastal zone and the encumbent environmental considerations at stake.

DEVELOPMENT POTENTIAL OF SOILS FOR STRUCTURES

WITHOUT BASEMENTS BEFORE MANAGEMENT PRACTICES



Towns of Sandy Creek and Richland

0 ¼ mile

SLIGHT

MODERATE

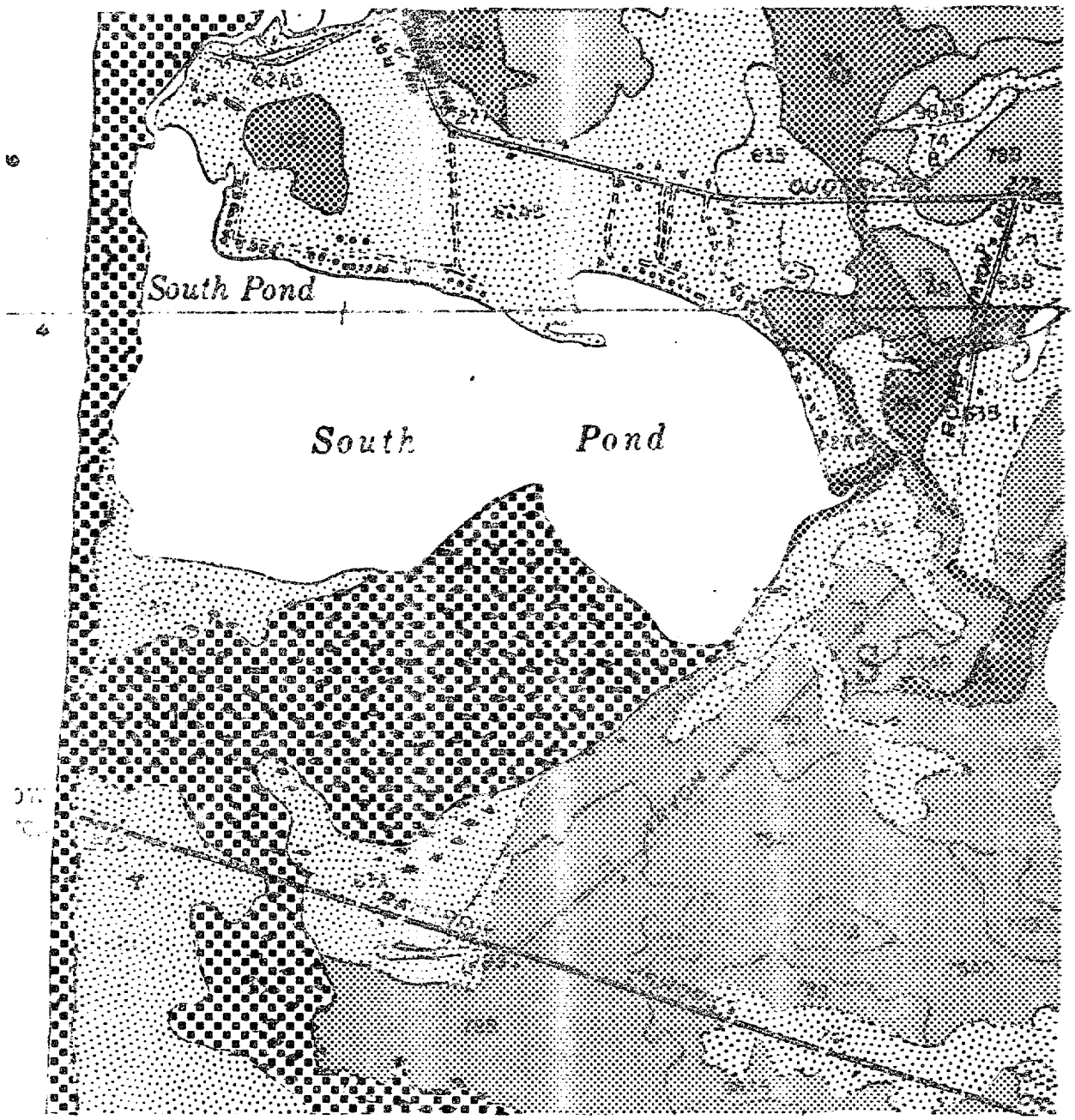
SEVERE

VERY SEVERE

Figure 1

DEVELOPMENT POTENTIAL OF SOILS FOR STRUCTURES

WITHOUT BASEMENTS AFTER MANAGEMENT PRACTICES



Towns of Sandy Creek and Richland

0 = ½ mile

SLIGHT

MODERATE

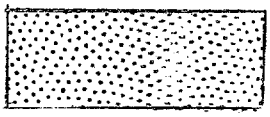
SEVERE

VERY SEVERE

Figure 2

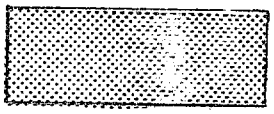
DEVELOPMENT POTENTIAL OF SOILS FOR
STRUCTURES without basements
WITH CONVENTIONAL MANAGEMENT PRACTICES

SLIGHT



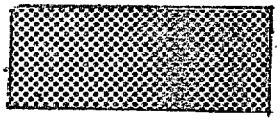
WELL DRAINED
NOT SUBJECT TO FLOODING
< 8 PERCENT SLOPE
LOW POTENTIAL FROST ACTION
DEEPER THAN 40 INCHES TO BEDROCK
< .1 PER CENT STONINESS
NO EXPOSED BEDROCK
GOOD PERMEABILITY
LOAMY TEXTURE

MODERATE



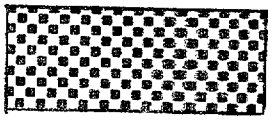
MODERATELY WELL DRAINED (4)
NOT SUBJECT TO FLOODING
8 TO 15 PERCENT SLOPES (1,3,8,9,11)
MODERATE POTENTIAL FROST ACTION (12)
BEDROCK AT 20 TO 40 INCHES (2, 13)
< 3 PERCENT STONINESS (6)
< 10 PERCENT ROCK OUTCROPS (6)
MODERATELY PERMEABLE (5)
GRAVELLY TEXTURES

SEVERE



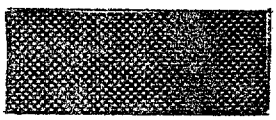
POORLY DRAINED
RARELY FLOODED
15 TO 25 PERCENT SLOPES (1,3,8,9,11)
HIGH POTENTIAL FROST ACTION (12)
3 TO 15 PERCENT STONINESS (6)
10 TO 50 PERCENT ROCK OUTCROPS (6, 13)
BEDROCK < 20 INCHES DEEP (2, 7, 13)
MODERATELY SLOW TO SLOWLY
PERMEABLE (5)
HEAVY CLAY OR LOOSE SANDY OR
VERY GRAVELLY TEXTURES (14, 15)

VERY SEVERE



VERY POORLY DRAINED
OCCASIONAL FLOODING
> 25 PERCENT SLOPES
> 15 STONINESS (6)
> 50 PERCENT ROCK OUTCROPS (6, 13)
VERY SLOWLY PERMEABLE (2)
BEDROCK < 20 INCHES DEEP (2, 7, 13)
LOOSE SAND OR ORGANIC TEXTURES (14, 15, 17

MADELAND



UNITS OF SOILS TOO DISTRUBED TO
CONSISTENTLY RATE, ONSITE
INVESTIGATIONS SHOULD BE MADE
ON AN INDIVIDUAL BASIS TO DETERMINE
THE USE POTENTIAL. MOST AREAS OF
THESE SOILS ARE IN A PERMANENT
LAND USE.

CONVENTIONAL
MANAGEMENT PRACTICES

1. Install tile field on the contour--where slope is the main limitation to the installation and functioning of a septic system, installation on the contour may overcome the problem. By excavating into the slope and installing the filter lines on the contour with precautions against seepage, the system should function similarly to one installed on level ground. Careful consideration should be given to the design and installation where this management practice is to be implemented.

2. Conventional septic systems won't work, consider alternative systems. Soils with severe restrictions of depth, drainage, or permeability may not be able to be modified by management to accept a conventionally installed septic tank system. Where this is the case, the individual should consider contacting sanitary engineer to assist in constructing a system which will function properly under the existing soil conditions. Some alternative systems are:

   a) Sand filter systems
   b) Evapotranspiration systems
   c) Holding tanks
   d) Individual sewage treatment plants

3. Pipe septic material to more level area and install filter field. This management is mainly applicable when slope is the only limiting factor in terms of developing a structure with a conventional septic system. The septic system could be constructed on a more level site apart from the actual structure location and sewage and waste piped to the filter field.

4. Artificial drainage is probably the most commonly employed management practice for most types of development. Included in the broad definition of artificial drainage is almost any type of excess water management such as:

   a) tile drainage
   b) open ditch drainage
   c) surface runoff interceptors

   Where wetness is a problem, again, the developer should consider contacting SCS or an engineer to assist in the decision of what practice would work best and for technical assistance in design and installation.

5. In soils where the main limitation to properly functioning septic systems is slow permeability, the slowness can be compensated for by extending the length of the tile lines in the filter field. New York Health Department specifications recommend pipe and filter field size for various permeability rates. When permeability is very slow ($<$.06 in./hour) conventional filter fields will not function properly and alternate systems should be considered.

6. Where stoniness or rockiness are limitations to soil use the manual or mechanical removal or burial of such stones, boulders or rock outcrops should be a relatively unsophisticated although laborious task.

7. Explosives are an expensive management practice, as well as dangerous, but where hard bedrock is the main limitation to uses requiring excavation, explosives can be effective. All local laws and precautions should be adhered to when handling explosives.

8. Erosion is not a limitation listed in most interpretative guides, however, erosion control measures are a constantly reoccurring recommendation in this index. Practices such as minimum excavation on slopes, sediment basins, immediate reseeding, prevent soil loss by erosion and damage by sedimentation.

9. Where structures are being considered on slopes steeper than 8 percent, it might be to the builders' advantage to put a half basement out from the slopes.

10. Frost heaving in silty textured soils can cause expensive damage to structural foundations. Backfilling against the foundation with gravel can absorb the pressures of frost heave and minimize structural damage.

11. Where slopes are short and irregular, the site may be improved by grading of higher parts of the landform into some lower parts. Land leveling can also improve the surface drainage of a site.

12. Frost action can be more damaging to structures without basements than to structures with basements. Frost heave can crack the concrete slab upon which structures without basements (including mobile homes) are established. A thick sub-base of gravel under the slab will absorb the stresses of frost heave and reduce any possible damage.

13. Where depth to bedrock is a problem, there may not be sufficient soil on site to cover boulders or rock outcrops. Where this problem exists, fill can be excavated off site and hauled in to cover outcrops or fill shallow excavations in bedrock. Erosion control and reclamation measures should be used at the excation site.

14. Sandy soils are particularly difficult to work in where excavations with steep side slopes are necessary. To insure the safety of works around such excavations and to maintain the sides until an installation is made, wood or metal retainers or side supports should be promptly installed.

15. Soils with high clay content or fragipans can be more easily excavated if attention is given to their moisture content. Clayey soils become very to extremely firm during dry periods and become very sticky and difficult to maneuver equipment in when wet. A moderate moisture content allows such clayey soils to be most easily excavated. Soils with pans also become extremely hard during dry periods and except for extremely wet conditions are more easily excavated at high moisture contents.

16. Just as frost action can damage concrete slabs for homes it can cause cracking and heaving in roads. A thick, well graded gravel subbase under the road surface can absorb the stresses of frost heave and reduce damages to the road surface.

17. Organic soils have very low strength and in most cases very severe limitations usually based on wetness more than texture. However, where the organic layer is the most limiting factor, it could be mechanically removed and the mineral substratum utilized for the intended use, or fill could be imported to replace the organic layer and then the site could be utilized.

18. Maintenance of vegetative cover can be both an aesthetic and an erosion management. Erosion especially on more steeply sloping soils is extremely exacerated when vegetation is removed. Maintenance of vegetation can also insure an established landscape when construction is completed rather than costly and uncertainty of reseeding and landscaping with transplants or nursery stock.

19. The aesthetic or recreational quality of an area may outweight the natural limitations of the site as a camping area. Where depth to bedrock or slopes or both are limitations of developing natural campsites, level concrete pads can be constructed with adapters for anchoring tents of various sizes.

20. Areas subject to rare, occasional or even frequent flooding may still have potential use for most purposes where no structural improvements are to be made. By scheduling use of the area during non-flood season such sites could be used for picnic areas, hiking, bridal and biking trails, and a variety of other recreational activities.

21. Where wetness is the main limitation for recreational use of an area, some use may be realized by scheduling activities for the driest season of the year. This could be done for unimproved picnic areas, playgrounds and athletic fields.

CONCLUSION

As indicated, various soils exhibit certain characteristics which, for one or more reasons, make it undesirable to develop them for particular land uses. In certain cases, application of management practices may be used to upgrade soils so that they can be developed. It is important to recognize, however, that many management practices are expensive and sometimes are useful only for a limited amount of time. It is far more efficient to recognize natural limitations of certain soils and direct development to soils which are best suited for that development whenever possible.

Consulting detailed soils maps, weighing costs and benefits of management practices, and considering geologic characteristics will allow both economic and environmental concerns to be taken into account.

Recommendations

1. Certain soils which cannot be upgraded through normal management practices for intensive use should be regarded as areas of particular concern and as such should be kept free from land uses which will result in damage to either the development or the environment.

2. Detailed investigations and mapping should be done in the coastal zone so that the information can be used for operational planning.

3. Soils of a texture and topography susceptible to erodibility should be isolated and managed so that sedimentation can be controlled and development on them can be limited.

4. Soils which are highly suitable for certain activities should be the objects of management practices which encourage such activities, subject to the overall needs of the coastal zone.

APPENDIX I

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Fluvaquents & Udifluvents (frequently flooded) 1	Middlebury 5	Rumney 7
SEPTIC SYSTEMS	Very Severe: Frequent flooding	Severe: Occasional flooding	Severe: Occasional flooding, prolonged wetness
HOMES W/ BASEMENTS	Very Severe: Frequent flooding	Very Severe: Occasional flooding	Very Severe: Occasional flooding
HOMES W/O BASEMENTS	Very Severe: Frequent flooding	Very Severe: Occasional flooding	Very Severe: Occasional flooding
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Very Severe: Frequent flooding	Severe: Occasional flooding	Severe: Occasional flooding, prolonged wetness, poorly drained
LOCAL ROADS, STREETS AND PARKING LOTS	Very Severe: Frequent flooding	Severe: Occasional flooding	Severe: Occasional flooding, poorly drained
WATER EROSION	Slight	Slight	Slight
WIND EROSION	Slight	Slight	Slight
PLAY & PICNIC AREAS	Severe: flooding	Moderate: flooding	Severe: flooding & seasonal wetness
CAMPSITES	Very Severe: Frequent flooding	Severe: flooding	Severe: flooding & seasonal wetness

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Wallkill 10	Sand Dunes 11	Canaan-Rockoutcrop Association 12
SEPTIC SYSTEMS	Very Severe: Frequent flooding, seasonal ponding	Very Severe: Unique sensitive areas*	Very Severe: Depth to bedrock, Rockoutcrops
HOMES W/ BASEMENTS	Very Severe: Frequent flooding, very poorly drained, seasonal ponding	Very Severe: Unique sensitive areas	Very Severe: Depth to bedrock, Rockoutcrops
HOMES W/O BASEMENTS	Very Severe: Frequent flooding, Very poorly drained, Seasonal ponding	Very Severe: Unique sensitive areas	Severe: Depth to bedrock, Rockoutcrops
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Very Severe: Frequent flooding, Very poorly drained, Seasonal ponding	Very Severe: Unique sensitive areas	Very Severe: Depth to bedrock, Rockoutcrops
LOCAL ROADS, STREETS AND PARKING LOTS	Very Severe: Frequent flooding, Very poorly drained	Very Severe: Unique sensitive areas	Severe: Depth to bedrock
WATER EROSION	Slight	Slight	Slight
WIND EROSION	Slight	Very Severe: Sandy texture, unique sensitive areas	Slight
PLAY & PICNIC AREAS	Severe: flooding & seasonal wetness	Very severe: sandy texture, unique sensitive areas	Severe: bedrock outcrops
CAMPSITES	Very severe: very poorly drained, flooding, wetness	Very severe: sandy texture, unique sensitive areas	Very severe: shallow bedrock and outcrops

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Madeland 13 or M.L.	Minoa 15AB
SEPTIC SYSTEMS	Variable	Severe: Seasonal wetness
HOMES W/ BASEMENTS	Variable	Very Severe: Seasonal wetness
HOMES W/O BASEMENTS	Variable	Severe: Seasonal wetness
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Variable	Severe: Somewhat poorly drained, seasonal wetness
LOCAL ROADS, STREETS AND PARKING LOTS	Variable	Moderate: Somewhat poorly drained
WATER EROSION	Variable	Slight
WIND EROSION	Variable	Slight
PLAY & PICNIC AREAS	Variable	Moderate: seasonal wetness
CAMPSITES	Variable	Moderate: seasonal wetness

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Minoa 16 AB	Lamson 18	Windsor 20 AB
SEPTIC SYSTEMS	Severe: Seasonal wetness	Very Severe: seasonal ponding	Slight
HOMES W/ BASEMENTS	Severe: Somewhat poorly drained, seasonal wetness	Very Severe: Very poorly drained, seasonal ponding	Slight
HOMES W/O BASEMENTS	Moderate: Somewhat poorly drained, seasonal wetness	Very Severe: Very poorly drained, seasonal ponding	Slight
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Severe: Somewhat poorly drained, seasonal wetness	Very Severe: Very poorly drained, Seasonal ponding	Very Severe: Sandy texture
LOCAL ROADS, STREETS AND PARKING LOTS	Moderate: Somewhat poorly drained	Very Severe: Very poorly drained	Slight
WATER EROSION	Slight	Slight	Slight
WIND EROSION	Slight	Slight	Moderate: Sandy texture
PLAY & PICNIC AREAS	Moderate: seasonal wetness	Severe: prolonged wetness	Moderate: Sandy texture
CAMPSITES	Severe: flooding	Very Severe: poor stability, prolonged wetness	Moderate: Sandy texture

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Windsor 20 CK	Naumburg 21	Granby 22
SEPTIC SYSTEMS	Moderate: Slope	Very Severe: Prolonged wetness	Very Severe: Prolonged wetness
HOMES W/ BASEMENTS	Moderate: Slope	Very Severe: Prolonged wetness *High W.T. @ 0-6"	Very Severe: Prolonged wetness *High W.T. @ 0-6"
HOMES W/O BASEMENTS	Moderate: Slope	Very Severe: Prolonged wetness *High W.T. @ 0-6"	Very Severe: Poorly drained, Prolonged wetness *High W.T. @ 0-6"
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Very Severe: Sandy texture	Very Severe: Sandy texture *High W.T. @ 0-6"	Very Severe: Sandy texture *High W.T. @ 0-6"
LOCAL ROADS, STREETS AND PARKING LOTS	Moderate: Slope	Severe: Poorly drained	Severe: Poorly drained
WATER EROSION	Slight	Slight	Slight
WIND EROSION	Moderate: Sandy texture	Slight	Slight
PLAY & PICNIC AREAS	Moderate: Sandy texture and slope	Severe: Prolonged wetness	Severe: Prolonged wetness
CAMPSITES	Moderate: Sandy texture and slope	Very Severe: Sandy texture, Prolonged wetness	Very Severe: Sandy texture, Prolonged wetness

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Deerfield 23 AB	Hudson 25 B	Hudson 25 C
SEPTIC SYSTEMS	Severe: Seasonal wetness	Severe: Slow permeability	Severe: Slow permeability
HOMES W/ BASEMENTS	Moderate: Seasonal wetness	Severe: Seasonal wetness *High W.T. @12-18"	Severe: Seasonal wetness *High W.T. @12-18"
HOMES W/O BASEMENTS	Slight	Severe: *High W.T. @12-18"	Severe: *High W.T. @12-18"
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Very Severe: Sandy texture	Moderate: Seasonal wetness, Moderately well drained	Moderate: Seasonal wetness, Slope
LOCAL ROADS, STREETS AND PARKING LOTS	Slight	Severe: Frost Action	Severe: Frost Action
WATER EROSION	Slight	Moderate: Slope	Moderate: Slope
WIND EROSION	Moderate: Sandy texture	Slight	Slight
PLAY & PICNIC AREAS	Slight	Slight	Slight
CAMPSITES	Slight	Moderate: Seasonal wetness	Moderate: Wetness, Slope

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Hudson 25 CK	Rhinebeck 29 A	Rhinebeck 29 B
SEPTIC SYSTEMS	Severe: Slow permeability	Severe: Slow permeability, Seasonal wetness	Severe: Slow permeability, Seasonal wetness
HOMES W/ BASEMENTS	Severe: Seasonal wetness, Slope *High W.T. @12-18"	Very Severe: Seasonal wetness *High W.T. @6-18"	Very Severe: Seasonal wetness *High W.T. @ 6-18"
HOMES W/O BASEMENTS	Severe: *High W.T. @ 12-18"	Severe: *High W.T. @6-18"	Severe: *High W.T. @6-18"
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Moderate: Seasonal wetness, Slope	Severe: Somewhat poorly drained, Seasonal wetness; Clayey texture	Severe: Seasonal wetness, Clayey texture
LOCAL ROADS, STREETS AND PARKING LOTS	Severe: Frost action	Severe: Frost action	Severe: Frost action
WATER EROSION	Moderate: Slope	Slight	Moderate: Slope
WIND EROSION	Slight	Slight	Slight
PLAY & PICNIC AREAS	Slight	Moderate: Seasonal wetness	Moderate: Seasonal wetness
CAMPSITES	Moderate: Slope	Severe: Seasonal wetness	Severe: Seasonal wetness, Slope

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Madalin 30	Fonda 31	Canandaigua 34AB
SEPTIC SYSTEMS	Very Severe: Seasonal ponding	Very Severe: Seasonal ponding	Very Severe: Seasonal ponding
HOMES W/ BASEMENTS	Very Severe: Seasonal ponding, Very poorly drained	Very Severe: Very poorly drained, Seasonal ponding	Very Severe: Very poorly drained, Seasonal ponding
HOMES W/O BASEMENTS	Very Severe: Very poorly drained, Seasonal ponding	Very Severe: Very poorly drained, Seasonal ponding	Very Severe: Very poorly drained, Seasonal ponding
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Very Severe: Very poorly drained, Seasonal ponding	Very Severe: Very poorly drained, Seasonal ponding	Very Severe: Very poorly drained, Seasonal ponding
LOCAL ROADS, STREETS AND PARKING LOTS	Very Severe: Very poorly drained	Very Severe: Very poorly drained	Very Severe: Very poorly drained
WATER EROSION	Slight	Slight	Slight
WIND EROSION	Slight	Slight	Slight
PLAY & PICNIC AREAS	Severe: Prolonged wetness	Severe: Prolonged wetness	Severe: Prolonged wetness
CAMPSITES	Very Severe: Very poorly drained, Seasonal ponding	Very Severe: Prolonged wetness, Seasonal ponding	Very Severe: Prolonged wetness, Seasonal ponding

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

Raynham
35 AB

SEPTIC SYSTEMS	Severe: Slow permeability, Seasonal wetness
HOMES W/ BASEMENTS	Very Severe: Seasonal wetness *High W.T. @6-18"
HOMES W/O BASEMENTS	Severe: Seasonal wetness *High W.T. @6-18"
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Severe: Somewhat poorly drained, Seasonal wetness
LOCAL ROADS, STREETS AND PARKING LOTS	Severe: Frost action
WATER EROSION	Slight
WIND EROSION	Slight
PLAY & PICNIC AREAS	Severe: Prolonged wetness
CAMPSITES	Very Severe: Prolonged wetness; Seasonal ponding

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Brockport 50 AB	Herkimer 52 B	Herkimer 52 C
SEPTIC SYSTEMS	Severe: Slow permeability, Seasonal wetness, Depth to bedrock	Slight	Moderate: Slope
HOMES W/ BASEMENTS	Very Severe: Seasonal wetness, Depth to bedrock *High W.T. @6-18"	Slight	Moderate: Slope
HOMES W/O BASEMENTS	Severe: *High W.T. @6-18"	Slight	Moderate: Slope
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Severe: Somewhat poorly drained, Seasonal wetness, Depth to bedrock, Clayey texture	Very Severe: Sandy texture	Very Severe: Sandy texture
LOCAL ROADS, STREETS AND PARKING LOTS	Severe: Frost action	Slight	Moderate: Slope
WATER EROSION	Slight	Moderate: Slope	Moderate: Slope
WIND EROSION	Slight	Slight	Slight
PLAY & PICNIC AREAS	Moderate: Seasonal wetness	Slight	Moderate: Slope
CAMPSITES	Severe: Seasonal wetness	Moderate: Shale fragments	Severe: Shale fragments, Slope

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Alton 56 CK	Alton 57 AB	Hinckley 62 AB
SEPTIC SYSTEMS	Moderate: Slope	Slight	Slight
HOMES W/ BASEMENTS	Moderate: Slope	Slight	Slight
HOMES W/O BASEMENTS	Moderate: Slope	Slight	Slight
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Very Severe: Sandy texture	Very Severe: Sandy texture	Very Severe: Sandy texture
LOCAL ROADS, STREETS AND PARKING LOTS	Moderate: Slope	Slight	Slight
WATER EROSION	Moderate: Slope	Moderate: Slope	Slight
WIND EROSION	Slight	Slight	Slight
PLAY & PICNIC AREAS	Moderate: Slope	Slight	Slight
CAMPSITES	Moderate: Slope	Slight	Slight

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Hinckley 62 C	Alton 63 A	Alton 63 B
SEPTIC SYSTEMS	Moderate: Slope	Slight	Slight
HOMES W/ BASEMENTS	Moderate: Slope	Slight	Slight
HOMES W/O BASEMENTS	Moderate: Slope	Slight	Slight
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Very Severe: Sandy texture	Very Severe: Sandy texture	Very Severe: Sandy texture
LOCAL ROADS, STREETS AND PARKING LOTS	Moderate: Slope	Slight	Slight
WATER EROSION	Moderate: Slope	Slight	
WIND EROSION			
PLAY & PICNIC AREAS			
CAMPSITES			

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

Alton
63 C

SEPTIC SYSTEMS	Moderate: Slope
HOMES W/ BASEMENTS	Moderate: Slope
HOMES W/O BASEMENTS	Moderate: Slope
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Very Severe: Sandy texture
LOCAL ROADS, STREETS AND PARKING LOTS	Moderate: Slope
WATER EROSION	Moderate: Slope
WIND EROSION	Slight
PLAY & PICNIC AREAS	Slight
CAMPSITES	Moderate: Slope

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Fredon 67 ±B	Halsey 68	Sun 70
SEPTIC SYSTEMS	Very Severe: Prolonged wetness	Very Severe: Seasonal ponding	Very Severe: Seasonal ponding
HOMES W/ BASEMENTS	Very Severe: Prolonged wetness *High W.T. @0-6"	Very Severe: Poorly drained, seasonal ponding	Very Severe: very poorly drained, seasonal ponding
HOMES W/O BASEMENTS	Very Severe: Prolonged wetness, Frost action *High W.T. @0-6"	Very Severe: Very poorly drained, Seasonal ponding, Frost action	Very Severe: Very poorly drained, Seasonal ponding, Frost action
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Severe: Poorly drained, prolonged wetness	Very Severe: Very poorly drained, seasonal ponding	Very Severe: Very poorly drained, seasonal ponding
LOCAL ROADS, STREETS AND PARKING LOTS	Severe: Poorly drained, Frost action	Very Severe: Very poorly drained; Frost action	Very Severe: Very poorly drained, Frost action
WATER EROSION	Slight	Slight	Slight
WIND EROSION	Slight	Slight	Slight
PLAY & PICNIC AREAS	Severe: Prolonged wetness	Severe: Prolonged wetness, Ponding	Severe: Prolonged wetness, Ponding
CAMPSITES	Very Severe: Prolonged wetness	Very Severe: Prolonged wetness, Ponding	Very Severe: Prolonged wetness, Ponding

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Empeyville 72 AB	Empeyville 72 C	Sodus 74 B
SEPTIC SYSTEMS	Severe: Slow permeability	Severe: Slow permeability	Severe: Slow permeability
HOMES W/ BASEMENTS	Moderate: Moderately well drained, Seasonal wetness	Moderate: Seasonal wetness, Slope	Slight
HOMES W/O BASEMENTS	Moderate: Frost action	Moderate: Frost action, Slope	Slight
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Moderate: Moderately well drained, Seasonal wetness	Moderate: Seasonal wetness; Slope	Slight
LOCAL ROADS, STREETS AND PARKING LOTS	Moderate: Frost Action	Moderate: Frost action	Moderate: Frost action
WATER EROSION	Slight	Moderate: Slope	Slight
WIND EROSION	Slight	Slight	Slight
PLAY & PICNIC AREAS	Moderate: Seasonal wetness	Moderate: Seasonal wetness	Slight
CAMPSITES	Moderate: Seasonal wetness	Severe: Seasonal wetness, Slope	Slight

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Sodus 74 C	Sodus 74 D
SEPTIC SYSTEMS	Severe: Slow permeability	Severe: Slow permeability, Slope
HOMES W/ BASEMENTS	Moderate: Slope	Severe: Slope
HOMES W/O BASEMENTS	Moderate: Slope	Severe: Slope
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Moderate: Slope	Severe: Slope
LOCAL ROADS, STREETS AND PARKING LOTS	Moderate: Slope	Severe: Slope
WATER EROSION	Moderate: Slope	Severe: Slope
WIND EROSION	Slight	Slight
PLAY & PICNIC AREAS	Slight	Moderate: Slope
CAMPSITES	Moderate: Slope	Severe: Slope

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Sodus 74 EF	Ira-Sodus (rolling) 74 CK	Ira-Sodus (very stony) 75 AD
SEPTIC SYSTEMS	Very Severe: Slope	Severe: Slow permeability	Severe: Slow permeability, Large stones, Slope 15%
HOMES W/ BASEMENTS	Very Severe: Slope	Moderate: Seasonal wetness, Slope	Moderate: Seasonal wetness, Large stones, Slope 8-15% Severe: Slope 15%
HOMES W/O BASEMENTS	Very Severe: Slope	Severe: Frost action	Severe: Frost action, Slope 15%
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Very Severe: Slope	Moderate: Seasonal wetness, Slope	Moderate: Seasonal wetness, Large stones Severe: Slopes 15%
LOCAL ROADS, STREETS AND PARKING LOTS	Very Severe: Slope	Severe: Frost action	Severe: Frost action
WATER EROSION	Severe: Slope	Moderate: Slope	Moderate: Slope
WIND EROSION	Slight	Slight	Slight
PLAY & PICNIC AREAS	Severe: Slope	Moderate: Slope	Moderate: Wetness, Slope
CAMPSITES	Severe: Slope	Severe: Seasonal wetness	Severe: Wetness, Slope, Large stones, Slope

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Worth (gravelly) 76 B	Worth (gravelly) 76 C	Worth (gravelly) 76 CK
SEPTIC SYSTEMS	Severe: Slow permeability	Severe: Slow permeability	Severe: Slow permeability
HOMES W/ BASEMENTS	Slight	Moderate: Slope	Moderate: Slope
HOMES W/O BASEMENTS	Moderate: Frost action	Moderate: Frost action, Slope	Moderate: Frost action, Slope
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Moderate: Small stones	Moderate: Small stones, Slope	Moderate: Small stones, Slope
LOCAL ROADS, STREETS AND PARKING LOTS	Moderate: Frost action	Moderate: Frost action, Slope	Moderate: Frost action, Slope
WATER EROSION	Slight	Moderate: Slope	Moderate: Slope
WIND EROSION	Slight	Slight	Slight
PLAY & PICNIC AREAS	Slight	Slight	Slight
CAMPSITES	Slight	Moderate: Slope	Moderate: Slope

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Ira (gravelly) 78 A	Ira (gravelly) 78 B
SEPTIC SYSTEMS	Severe: Slow permeability	Severe: Slow permeability
HOMES W/ BASEMENTS	Moderate: Moderately well drained, Seasonal wetness, Frost action	Moderate: Seasonal wetness, Frost action
HOMES W/O BASEMENTS	Severe: Frost action	Severe: Frost action
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Moderate: Moderately well drained, Seasonal wetness, Small stones	Moderate: Seasonal wetness, Small stones
LOCAL ROADS, STREETS AND PARKING LOTS	Severe: Frost action	Severe: Frost action
WATER EROSION	Slight	Slight
WIND EROSION	Slight	Slight
PLAY & PICNIC AREAS	Slight	Slight
CAMPSITES	Moderate: Seasonal wetness	Moderate: Seasonal wetness

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Ira (gravelly) 78 C	Amboy 81 B	Amboy 81 C (eroded)
SEPTIC SYSTEMS	Severe: Slow permeability	Severe: Slow permeability	Severe: Slow permeability
HOMES W/ BASEMENTS	Moderate: Seasonal wetness, Frost action, Slope	Moderate: Seasonal wetness	Moderate: Seasonal wetness, Slope
HOMES W/O BASEMENTS	Severe: Frost action	Moderate: Frost action	Moderate: Frost action, Slope
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Moderate: Seasonal wetness, Small stones, Slope	Moderate: Sandy texture	Moderate: Sandy texture, Slope
LOCAL ROADS, STREETS AND PARKING LOTS	Severe: Frost action	Moderate: Frost action	Moderate: Frost action, Slope
WATER EROSION	Moderate: Slope	Moderate: Slope	Severe: Slope
WIND EROSION	Slight	Slight	Slight
PLAY & PICNIC AREAS	Slight	Slight	Slight
CAMPSITES	Moderate: Slope	Slight	Moderate: Slope

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Amboy 81 CK (eroded)	Amboy 81 D (eroded)	Amboy 81 EF (eroded)
SEPTIC SYSTEMS	Severe: Slow permeability	Severe: Slow permeability, Slope	Very Severe: Slope
HOMES W/ BASEMENTS	Moderate: Seasonal wetness, Slope	Severe: Slope	Very Severe: Slope
HOMES W/O BASEMENTS	Moderate: Frost action, Slope	Severe: Slope	Very Severe: Slope
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Moderate: Sandy texture, Slope	Severe: Slope	Very Severe: Slope
LOCAL ROADS, STREETS AND PARKING LOTS	Moderate: Frost action, Slope	Severe: Slope	Very Severe: Slope
WATER EROSION	Severe: Slope	Severe: Slope	Very Severe: Slope
WIND EROSION	Slight	Slight	Slight
PLAY & PICNIC AREAS	Slight	Moderate: Slope	Severe: Slope
CAMPSITES	Moderate: Slope	Severe: Slope	Very Severe: Slope

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Williamson 84 A	Williamson 84 B	Williamson 84 C
SEPTIC SYSTEMS	Severe: Slow permeability	Severe: Slow permeability	Severe: Slow permeability
HOMES W/ BASEMENTS	Severe: Seasonal wetness *High W.T. @12-24"	Severe: Seasonal wetness *High W.T. @12-24"	Severe: Seasonal wetness *High W.T. @12-24"
HOMES W/O BASEMENTS	Severe: Frost action *High W.T. @12-24"	Severe: Frost action *High W.T. @12-24"	Severe: Frost action *High W.T. @12-24"
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Moderate: Moderately well drained, Seasonal wetness	Moderate: Seasonal wetness	Moderate: Seasonal wetness, Slope
LOCAL ROADS, STREETS AND PARKING LOTS	Severe: Frost action	Severe: Frost action	Severe: Frost action
WATER EROSION	Slight	Moderate: Slope	Severe: Slope
WIND EROSION	Slight	Slight	Slight
PLAY & PICNIC AREAS	Slight	Slight	Moderate: Slope
CAMPSITES	Moderate: Seasonal wetness	Moderate: Seasonal wetness	Severe: Slope, Seasonal wetness

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Scriba (gravelly) 98 AB	Scriba (gravelly) 98 C	Scriba (very stony) 99 AB
SEPTIC SYSTEMS	Severe: Slow permeability, Seasonal wetness	Severe: Slow permeability, Seasonal wetness	Severe: Slow permeability, Large stones, Seasonal wetness
HOMES W/ BASEMENTS	Very Severe: Seasonal wetness *High W.T. @6-18"	Very Severe: Seasonal wetness *High W.T. @6-18"	Very Severe: Seasonal wetness *High W.T. @6-18"
HOMES W/O BASEMENTS	Severe: Seasonal wetness *High W.T. @6-18"	Severe: Seasonal wetness *High W.T. @6-18"	Severe: Seasonal wetness *High W.T. @6-18"
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Severe: Somewhat poorly drained, Seasonal wetness	Severe: Somewhat poorly drained, Seasonal wetness	Severe: Somewhat poorly drained, Seasonal wetness
LOCAL ROADS, STREETS AND PARKING LOTS	Moderate: Somewhat poorly drained, Frost action	Moderate: Somewhat poorly drained, Frost action, Slope	Moderate: Somewhat poorly drained, Frost action
WATER EROSION	Slight	Moderate: Slope	Slight
WIND EROSION	Slight	Slight	Slight
PLAY & PICNIC AREAS	Moderate: Seasonal wetness	Moderate: Seasonal wetness, Slope	Moderate: Seasonal wetness, Stones
CAMPSITES	Severe: Seasonal wetness	Severe: Seasonal wetness, Slope	Severe: Seasonal wetness, Stones

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Beaches 111	Massena 112 AB	Cut & Fill 113 or C.F.
SEPTIC SYSTEMS	Very Severe: Unique areas*	Severe: Seasonal wetness	Variable
HOMES W/ BASEMENTS	Very Severe: Unique areas*	Severe: Somewhat poorly drained, Seasonal wetness	Variable
HOMES W/O BASEMENTS	Very Severe: Unique areas	Moderate: Seasonal wetness	Variable
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Very Severe: Unique areas	Severe: Somewhat poorly drained, Seasonal wetness	Variable
LOCAL ROADS, STREETS AND PARKING LOTS	Very Severe: Unique areas	Moderate: Somewhat poorly drained, Frost action	Variable
WATER EROSION	Very Severe: Unique areas	Slight	Variable
WIND EROSION	Very Severe: Unique areas	Slight	Variable
PLAY & PICNIC AREAS	Very Severe: Unique areas	Moderate: Seasonal wetness	Variable
CAMPSITES	Very Severe: Unique areas	Severe: Seasonal wetness	Variable

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Oakville 120 AB	Swanton 122
SEPTIC SYSTEMS	Slight	Very Severe: Prolonged wetness
HOMES W/ BASEMENTS	Slight	Very Severe: Prolonged wetness *High W.T. @0-6"
HOMES W/O BASEMENTS	Slight	Very Severe: Prolonged wetness *High W.T. @0-6"
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Very Severe: Sandy texture	Severe: Poorly drained, Prolonged wetness
LOCAL ROADS, STREETS AND PARKING LOTS	Slight	Severe: Poorly drained
WATER EROSION	Slight	Slight
WIND EROSION	Moderate: Sandy texture	Slight
PLAY & PICNIC AREAS	Moderate: Surface texture	Moderate: Prolonged wetness
CAMPSITES	Moderate: Surface texture	Severe: Prolonged wetness

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Elmwood 125 AB	Rumaquepts & Fibrists, (ponded; fresh water marsh) 133	Carlisle (muck) M
SEPTIC SYSTEMS	Severe: Slow permeability	Very Severe: Seasonal ponding Unique areas*	Very Severe: Seasonal ponding
HOMES W/ BASEMENTS	Moderate: Moderately well drained, Seasonal wetness	Very Severe: Seasonal ponding Unique areas*	Very Severe: Seasonal ponding, Very poorly drained
HOMES W/O BASEMENTS	Severe: Frost action	Very Severe: Seasonal ponding Unique areas	Very Severe: Very poorly drained, Seasonal ponding
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Moderate: Moderately well drained, Seasonal wetness	Very Severe: Seasonal ponding Unique areas	Very Severe: Very poorly drained, Seasonal ponding, Organic texture
LOCAL ROADS, STREETS AND PARKING LOTS	Severe: Frost action	Very Severe: Very poorly drained Unique areas	Very Severe: Very poorly drained, Organic texture
WATER EROSION	Moderate: Slope	Slight	Slight
WIND EROSION	Slight	Slight	Moderate: In cultivated areas
PLAY & PICNIC AREAS	Slight	Very Severe: Ponding, Unique areas	Very Severe: Ponding, Organic texture
CAMPSITES	Moderate: Seasonal wetness	Very Severe: Ponding, Unique areas	Very Severe: Ponding, Organic texture

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Palms (muck) MI	Rifle (muck) OPM	Adams-Windsor, complex 020 AC
SEPTIC SYSTEMS	Very Severe: Seasonal ponding	Very Severe: Seasonal ponding	Slight: Moderate: Slopes 8%
HOMES W/ BASEMENTS	Very Severe: Very poorly drained, Seasonal ponding	Very Severe: Very poorly drained, Seasonal ponding	Slight: Moderate: Slope 8%
HOMES W/O BASEMENTS	Very Severe: Very poorly drained, Seasonal ponding	Very Severe: Very poorly drained, Seasonal ponding	Slight: Moderate: Slopes 8%
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Very Severe: Very poorly drained, Seasonal ponding, Organic texture	Very Severe: Very poorly drained, Seasonal ponding, Organic texture	Very Severe: Sandy texture
LOCAL ROADS, STREETS AND PARKING LOTS	Very Severe: Very poorly drained, Organic texture	Very Severe: Very poorly drained, Organic texture	Slight
WATER EROSION	Slight	Slight	Slight
WIND EROSION	Moderate: In cultivated areas	Slight	Moderate: Sandy texture, Slope
PLAY & PICNIC AREAS	Very Severe: Ponding, Organic texture	Very Severe: Ponding, Organic texture	Moderate: Sandy texture
CAMPSITES	Very Severe: Ponding, Organic texture	Very Severe: Ponding, Organic texture	Moderate: Sandy texture

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

Adams-Windsor,
complex 020 D

SEPTIC SYSTEMS	Severe: Slope
HOMES W/ BASEMENTS	Severe: Slope
HOMES W/O BASEMENTS	Severe: Slope
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Very Severe: Sandy texture
LOCAL ROADS, STREETS AND PARKING LOTS	Severe: Texture
WATER EROSION	Moderate: Slope
WIND EROSION	Moderate: Slope
PLAY & PICNIC AREAS	Severe: Sandy texture, Slope
CAMPSITES	Very Severe: Sandy texture, Slope

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Naumburg-Granby, complex 022AB	Colton-Hinckley, complex 063A	Colton-Hinckley, complex 063D
SEPTIC SYSTEMS	Very Severe: Prolonged wetness	Slight: Moderate: Slopes 8%	Severe: Slope
HOMES W/ BASEMENTS	Very Severe: Prolonged wetness *High W.T. @0-6"	Slight: Moderate: Slopes 8%	Severe: Slope
HOMES W/O BASEMENTS	Very Severe: Prolonged wetness *High W.T. @0-6"	Slight: Moderate: Slopes 8%	Severe: Slope
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Very Severe: Sandy texture	Very Severe: Sandy texture	Very Severe: Sandy texture
LOCAL ROADS, STREETS AND PARKING LOTS	Severe: Poorly drained	Slight: Moderate: Slopes 8%	Severe: Slope
WATER EROSION	Slight	Slight	Moderate: Slope
WIND EROSION	Slight	Slight	Slight
PLAY & PICNIC AREAS	Severe: Sandy texture, Prolonged wetness	Moderate: Slope, Gravel	Moderate: Slope
CAMPSITES	Very Severe: Sandy texture, Prolonged wetness	Moderate: Slope	Severe: Slope

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Colton-Hinckley, complex 063EF	Naumburg-Duane, complex 067AB	Worth & Empeyville (extremely stony) 075AD
SEPTIC SYSTEMS	Very Severe: Slope	Very Severe: Prolonged wetness	Severe: Slow permeability, Large stones, Slope 15%
HOMES W/ BASEMENTS	Very Severe: Slope	Very Severe: Prolonged wetness *High W.T. @0-6"	Severe: Large stones, Slopes 15%
HOMES W/O BASEMENTS	Very Severe: Slope	Very Severe: Prolonged wetness *High W.T. @0-6"	Severe: Large stones, Slope 15%
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Very Severe: Slope, Sandy texture	Very Severe: Sandy texture	Severe: Large stones, Slope 15%
LOCAL ROADS, STREETS AND PARKING LOTS	Very Severe: Slope	Severe: Poorly drained	Moderate: Large stones, Slopes 8-15% Severe: Slope 15%
WATER EROSION	Severe: Slope	Slight	Severe: Slope
WIND EROSION	Slight	Slight	Slight
PLAY & PICNIC AREAS	Very Severe: Slope	Severe: Prolonged wetness	Very Severe: Slope, Large stones
CAMPSITES	Very Severe: Slope	Very Severe: Prolonged wetness	Very Severe: Slope, Large stones

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Worth & Empeyville (very stony) 076AC	Worth & Empeyville (very stony) 076D
SEPTIC SYSTEMS	Severe: Slow permeability	Severe: Slow permeability, Slope
HOMES W/ BASEMENTS	Moderate: Large stones, Slopes 8%	Severe: Slope
HOMES W/O BASEMENTS	Moderate: Large stones, Slopes 8%	Severe: Slope
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Moderate: Large stones, Slopes 8%	Severe: Slope
LOCAL ROADS, STREETS AND PARKING LOTS	Slight: Moderate: Slopes 8%	Severe: Slope
WATER EROSION	Severe: Slope	Severe: Slope
WIND EROSION	Slight	Slight
PLAY & PICNIC AREAS	Severe: Slope, Large stones	Severe: Slope, Large stones
CAMPSITES	Very Severe: Slope, Large stones	Very Severe: Slope, Large stones

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Worth & Empeyville (very stony) 076EF	Westbury-Dannemora, complex (very stony) 095AB	Westbury (gravelly) 098AB
SEPTIC SYSTEMS	Very Severe: Slope	Very Severe: Prolonged wetness	Very Severe: Prolonged wetness, Large stones
HOMES W/ BASEMENTS	Very Severe: Slope	Very Severe: Prolonged wetness *High W.T. @0—6"	Very Severe: Prolonged wetness *High W.T. @0-6"
HOMES W/O BASEMENTS	Very Severe: Slope	Very Severe: Prolonged wetness *High W.T. @0—6"	Very Severe: Prolonged wetness *High W.T. @0-6"
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Very Severe: Slope	Severe: Poorly drained, Prolonged wetness	Severe: Poorly drained, Prolonged wetness, Large stones
LOCAL ROADS, STREETS AND PARKING LOTS	Very Severe: Slope	Severe: Poorly drained	Severe: Poorly drained
WATER EROSION	Very Severe: Slope	Slight	Slight
WIND EROSION	Slight	Slight	Slight
PLAY & PICNIC AREAS	Very Severe: Slope	Severe: Prolonged wetness	Severe: Prolonged wetness, Large stones
CAMPSITES	Very Severe: Slope	Very Severe: Prolonged wetness	Very Severe: Prolonged wetness, Large stones

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Urban Land U.L.	Gravel Pits G.P.	Water W
SEPTIC SYSTEMS	Variable	Variable	Not rated
HOMES W/ BASEMENTS	Variable	Variable	Not rated
HOMES W/O BASEMENTS	Variable	Variable	Not rated
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Variable	Variable	Not rated
LOCAL ROADS, STREETS AND PARKING LOTS	Variable	Variable	Not rated
WATER EROSION	Variable	Variable	Not rated
WIND EROSION	Variable	Variable	Not rated
PLAY & PICNIC AREAS	Variable	Variable	Not rated
CAMPSITES	Variable	Variable	Not rated

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

Westbury Dannamora
099AB

SEPTIC SYSTEMS	Very Severe: Prolonged wetness, Large stones
HOMES W/ BASEMENTS	Very Severe: Prolonged wetness *High W.T. @0-6"
HOMES W/O BASEMENTS	Very Severe: Prolonged wetness *High W.T. @0-6"
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Severe: Poorly drained, Prolonged wetness, Large stones
LOCAL ROADS, STREETS AND PARKING LOTS	Severe: Poorly drained
WATER EROSION	Slight
WIND EROSION	Slight
PLAY & PICNIC AREAS	Severe: Prolonged wetness, Stoniness
CAMPSITES	Very Severe: Prolonged wetness, Stoniness

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Na Niagara Fine Sandy loam	Ad Alden Mucky Silt loam	Gab Galen Fine Sandy Loam 2-6%
SEPTIC SYSTEMS	Severe: Seasonal wetness	Very Severe: Prolonged wetness	Moderate: Seasonal wetness
HOMES W/ BASEMENTS	Severe: Seasonal wetness	Very Severe: Prolonged wetness	Moderate: Seasonal wetness
HOMES W/O BASEMENTS	Severe: Seasonal wetness	Very Severe: Prolonged wetness	Moderate: Seasonal wetness
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Severe: Seasonal wetness	Very Severe: Prolonged wetness	Moderate: Seasonal wetness
LOCAL ROADS, STREETS AND PARKING LOTS	Moderate: Seasonal wetness	Very Severe: Prolonged wetness	Moderate: Seasonal wetness
WATER EROSION	Slight	Slight	Slight
WIND EROSION	Slight	Slight	Slight
PLAY & PICNIC AREAS	Moderate: Seasonal wetness	Very Severe: Prolonged wetness	Slight
CAMPSITES	Severe: Seasonal wetness	Very Severe: Prolonged wetness	Moderate: Seasonal wetness

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Sn Sloan Silt loam	CnB Colonie loamy fine sand 1-6%	Nc Niagara and Canandaigua Silt loam
SEPTIC SYSTEMS	Very Severe: Flooding, Prolonged wetness	Slight	Very Severe: Prolonged wetness
HOMES W/ BASEMENTS	Very Severe: Flooding, Prolonged wetness	Moderate: Fine sand surface layer and subsoil	Very Severe: Prolonged wetness
HOMES W/O BASEMENTS	Very Severe: Flooding, Prolonged wetness	Slight	Very Severe: Prolonged wetness
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Very Severe: Flooding, Prolonged wetness	Moderate: Fine sand subsurface layer & subsoil	Very Severe: Prolonged wetness
LOCAL ROADS, STREETS AND PARKING LOTS	Very Severe: Flooding, Prolonged wetness	Slight	Very Severe: Prolonged wetness
WATER EROSION	Slight	Slight	Slight
WIND EROSION	Slight	Slight	Slight
PLAY & PICNIC AREAS	Severe: Flooding, Prolonged wetness	Slight	Severe: Prolonged wetness
CAMPSITES	Very Severe: Flooding, Prolonged wetness	Slight	Very Severe: Prolonged wetness

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	Ac Alden Mucky Silt Loam
SEPTIC SYSTEMS	Very Severe: Prolonged wetness
HOMES W/ BASEMENTS	Very Severe: Prolonged wetness
HOMES W/O BASEMENTS	Very Severe: Prolonged wetness
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Very Severe: Prolonged wetness
LOCAL ROADS, STREETS AND PARKING LOTS	Very Severe: Prolonged wetness
WATER EROSION	Slight
WIND EROSION	Slight
PLAY & PICNIC AREAS	Severe: Prolonged wetness
CAMPSITES	Very Severe: Prolonged wetness

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	AOD Alton and Howard 15-25%	CMC Colonie loamy fine sand 6-12%	PNE Palmyra, Howard & Alton 25-40%
SEPTIC SYSTEMS	Very Severe: Slope, Permeability	Moderate: Slope	Very Severe: Slope
HOMES W/ BASEMENTS	Very Severe: Slope	Moderate: Slope	Very Severe: Slope
HOMES W/O BASEMENTS	Very Severe: Slope	Moderate: Slope	Very Severe: Slope
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Very Severe: Slope	Moderate: Slope	Very Severe: Slope
LOCAL ROADS, STREETS AND PARKING LOTS	Very Severe: Slope	Severe: Slope	Very Severe: Slope
WATER EROSION	Moderate: Slope	Slight	Moderate. Slope
WIND EROSION	Slight	Slight	Slight
PLAY & PICNIC AREAS	Very Severe: Slope	Slight	Very Severe: Slope
CAMPSITES	Very Severe: Slope	Moderate: Slope	Very Severe: Slope

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	AZF Aurora, Farmington, & Benson Very rocky 20-70%	CIB Collamer Silt loam 2-6%	CIA Collamer Silt loam 0-2%
SEPTIC SYSTEMS	Very Severe: Rock and Slope	Moderate: Seasonal wetness	Moderate: Seasonal wetness
HOMES W/ BASEMENTS	Very Severe: Rock, Slope	Moderate: Seasonal wetness	Moderate: Seasonal wetness
HOMES W/O BASEMENTS	Very Severe: Rock, Slope	Moderate: Seasonal wetness	Moderate: Seasonal wetness
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Very Severe: Rock, Slope	Moderate: Seasonal wetness	Moderate: Seasonal wetness
LOCAL ROADS, STREETS AND PARKING LOTS	Very Severe: Rock, Slope	Moderate: Seasonal wetness	Moderate: Seasonal wetness
WATER EROSION	Moderate: Slope	Slight	Moderate: Slope
WIND EROSION	Slight	Slight	Slight
PLAY & PICNIC AREAS	Very Severe: Slope	Slight	Very Severe: Slope
CAMPSITES	Very Severe: Slope	Moderate: Slope	Very Severe: Slope

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	DuD Dunkirk Silt Loam 12-18%	MS	EeL Eel Silt Loam
SEPTIC SYSTEMS	Very Severe: Slope	Very Severe: Prolonged wetness, Mucky soil	Very Severe: Flooding
HOMES W/ BASEMENTS	Very Severe: Slope	Very Severe: Prolonged wetness, Mucky soil	Very Severe: Flooding
HOMES W/O BASEMENTS	Very Severe: Slope	Very Severe: Prolonged wetness, Mucky soil	Very Severe: Flooding
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Very Severe: Slope	Very Severe: Prolonged wetness, Mucky soil	Very Severe: Flooding
LOCAL ROADS, STREETS AND PARKING LOTS	Very Severe: Slope	Very Severe: Prolonged wetness, Mucky soil	Very Severe: Flooding
WATER EROSION	Very Severe: Slope	Slight	Slight
WIND EROSION	Moderate: Slope	Slight	Slight
PLAY & PICNIC AREAS	Severe: Slope	Very Severe: Prolonged wetness, Mucky soil	Very Severe: Flooding
CAMPSITES	Very Severe: Slope	Very Severe: Prolonged wetness, Mucky soil	Very Severe: Flooding

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	OVA Ovid Silt loam 0-2%	OVB Ovid Silt loam 2-6%
SEPTIC SYSTEMS	Severe: Seasonal wetness	Severe: Seasonal wetness
HOMES W/ BASEMENTS	Severe: Seasonal wetness	Severe: Seasonal wetness
HOMES W/O BASEMENTS	Severe: Seasonal wetness	Severe: Seasonal wetness
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Severe: Seasonal wetness	Severe: Seasonal wetness
LOCAL ROADS, STREETS AND PARKING LOTS	Severe: Seasonal wetness	Severe: Seasonal wetness
WATER EROSION	Slight	Slight
WIND EROSION	Slight	Slight
PLAY & PICNIC AREAS	Moderate: Seasonal wetness	Moderate: Seasonal wetness
CAMPSITES	Severe: Seasonal wetness	Severe: Seasonal wetness

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	DVE Dunkirk 18-35%	CPD Colonie & Arkport 12-22%	PNE Palmyra, Howard, Alton 25-40%
SEPTIC SYSTEMS	Very Severe: Slope	Very Severe: Slope, Permeability	Very Severe: Slope
HOMES W/ BASEMENTS	Very Severe: Slope	Very Severe: Slope	Very Severe: Slope
HOMES W/O BASEMENTS	Very Severe: Slope	Very Severe: Slope	Very Severe: Slope
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Very Severe: Slope	Very Severe: Slope	Very Severe: Slope
LOCAL ROADS, STREETS AND PARKING LOTS	Very Severe: Slope	Very Severe: Slope	Very Severe: Slope
WATER EROSION	Severe: Slope	Moderate: Slope	Moderate: Slope
WIND EROSION	Moderate: Slope	Slight	Slight
PLAY & PICNIC AREAS	Very Severe: Slope	Very Severe: Slope	Very Severe: Slope
CAMPSITES	Very Severe: Slope	Very Severe: Slope	Very Severe: Slope

INTERPRETIVE TABLES FOR SOIL MAPPING UNITS IN THE COASTAL ZONE

	PW Phelps Gravelly Silt Loam	GAB Galen Fine Sandy Loam 2-6%	CMB Colonie loamy fine sand 6-12%
SEPTIC SYSTEMS	Moderate: Seasonal wetness	Moderate: Seasonal wetness	Moderate: Slope
HOMES W/ BASEMENTS	Moderate: Seasonal wetness	Moderate: Seasonal wetness	Moderate: Slope
HOMES W/O BASEMENTS	Moderate: Seasonal wetness	Moderate: Seasonal wetness	Moderate: Slope
SHALLOW EXCAVATIONS FOR UNDERGROUND ACTIVITIES	Moderate: Seasonal wetness	Moderate: Seasonal wetness	Moderate: Slope
LOCAL ROADS, STREETS AND PARKING LOTS	Moderate: Seasonal wetness	Moderate: Seasonal wetness	Moderate: Slope
WATER EROSION	Slight	Slight	Slight
WIND EROSION	Slight	Slight	Slight
PLAY & PICNIC AREAS	Moderate: Seasonal wetness	Moderate: Seasonal wetness	Moderate: Slope
CAMPSITES	Moderate: Seasonal wetness	Moderate: Seasonal wetness	Moderate: Slope

APPENDIX II

MAP KEY NO.	GENERAL SOILS ASSOCIATIONS
1.	Colonie-Arkport
2.	Colonie-Galen
3.	Colonie-Windsor
4.	Otisville-Hinckley
5.	Windsor-Adams
6.	Adams-Windsor
7.	Hinckley-Otisville
8.	Augres-Scarboro
9.	Stafford-Lamson
11.	Alton-Hinckley
12.	Alton-Otisville
13.	Alton-Williamson
14.	Arkport-Colonie
15.	Galen-Minoa
16.	Howard
17.	Howard-Chenango
18.	Howard-Unadilla
19.	Palmyra
20.	Palmyra-Alton
21.	Wampsville-Palmyra
22.	Palmyra-Alton-Howard
23.	Palmyra-Arkport
25.	Alluvial Land-Tioga Fan
26.	Hamlin Fan-Palmyra
27.	Hamlin-Teel
28.	Howard-Middlebury-Papakating
29.	Middlebury-Tioga-Papakating
30.	Lamson-Minoa
31.	Lamson-Niagara
32.	Minoa-Lamson
33.	Minoa-Niagara
34.	Alluvial Land-Rumney
35.	Minoa-Rumney
36.	Rumney-Saco
40.	Cazenovia-Ovid
41.	Hilton-Appleton
42.	Honeoye-Lima
43.	Lansing-Conesus
44.	Ontario
45.	Ontario-Hilton
46.	Ontario-Honeoye-Lansing
47.	Appleton-Hilton
48.	Kendaia-Lyons
49.	Camillus-Ontario
50.	Cazenovia-Aurora
51.	Mohawk-Palatine
53.	Ira-Sodus
54.	Langford-Erie
55.	Langford-Howard
56.	Mardin-Howard
57.	Mardin-Lordstown
58.	Sodus-Ira
59.	Worth-Empeyville
60.	Sodus
61.	Mardin-Langford
62.	Mardin-Langford-Howard
63.	Worth-Empeyville
64.	Chippewa-Volusia-Alden
65.	Ellery-Erie-Alden
66.	Erie-Langford
67.	Scriba-Ira
68.	Volusia-Mardin
69.	Westbury-Empeyville
71.	Collamer-Dunkirk
72.	Collamer-Niagara
73.	Dunkirk-Collamer
74.	Unadilla-Scio
75.	Williamson
76.	Williamson-Amboy
77.	Schoharie-Odessa
78.	Schoharie-Dunkirk
79.	Alden-Canandaigua
80.	Canandaigua-Niagara
81.	Cosad-Claverack
82.	Madalin-Lakemont-Fonda
83.	Madalin-Rhinebeck
84.	Rhinebeck-Dunkirk
85.	Rhinebeck-Madalin
86.	Wallington-Niagara
87.	Sloan-Teel
88.	Sloan-Madalin-Fonda
89.	Warners-Sloan-Muck
90.	Wayland-Wallington
92.	Benson-Wassaic
93.	Lordstown-Langford
94.	Lordstown-Mardin
95.	Manlius
96.	Wassaic-Benson
97.	Aurora-Farmington-Manlius
98.	Farmington-Benson
99.	Lordstown-Arnot
100.	Lordstown-Mardin-Langford
101.	Angola-Erie
102.	Angola-Varick
103.	Aurora-Angola
104.	Lairdsville-Brockport
106.	Fresh Water Marsh
107.	Muck-Peat
110.	Beaches
111.	Made Land
112.	Quarries
113.	Gravel Pits

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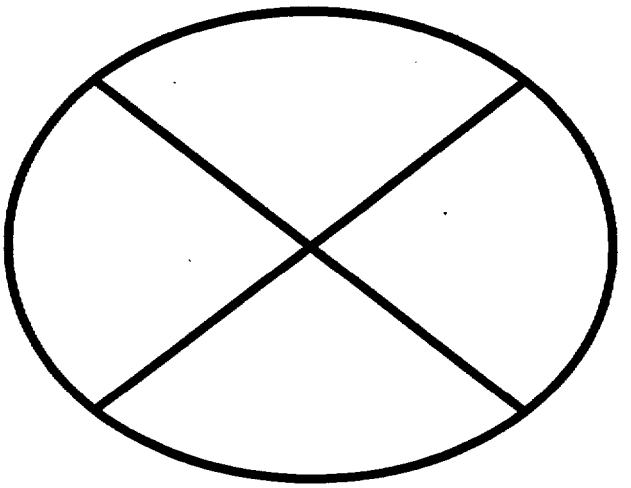

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WILDLIFE AND VEGETATION

CENTRAL NEW YORK COASTAL ZONE MANAGEMENT PROGRAM

PHASE I: TECHNICAL MEMO #6

DECEMBER 1975

INTRODUCTION

Purpose of Study

Coastal areas exhibit an abundance of vegetation and wildlife often not found in other places. Some species of both flora and fauna are considered to be rare or endangered. Many are unique in terms of their range in New York State and even nationally. The particular combination of land and water phenomena and climate in Central New York Coastal areas provides desirable habitat for many types of wildlife not found elsewhere.

In addition to their intrinsic qualities which make a variety of species important, wildlife and vegetation are valuable as providers of recreational opportunities for residents and visitors to Lake Ontario coastal areas. But flora and fauna are also fragile resources which, if severely exploited or encroached upon, can be easily destroyed.

The purpose of this study is to identify the various types of wildlife and vegetation found in CNY coastal areas and describe their geographic extent. Additionally, as mentioned above, certain species are known to be rare and/or display characteristics which make them unique. It is important to relate these various qualities in an effort to provide coastal decision-makers -- i.e., private citizens and public officials -- with information necessary to determine what species should be protected, what constitutes good wildlife habitat, what areas should be protected, and how these areas should be protected; in short, the development of a management program based on informed, rational choices. An important component of such a management program must rely on the sound application of conservation techniques to avert deterioration and ensure enhancement of coastal plants and animals.

Scope of Study and Study Area

To the extent that information is available, the study describes wildlife and vegetation phenomena in the land area just south and east of the Lake Ontario shoreline in Cayuga and Oswego counties. Technical Memo #2 describes three optional coastal zone boundary areas, the largest extending from between one and 15 miles landward. For study purposes for this memo, information is presented which describes characteristics based on the larger area (see map at the end of this report).

Information has been gathered from various local and state agency files, particularly those of the NYS Museum and Science Service. Additional material has been obtained by field checking and field notes of private conservationists and bird-watchers.

Along the approximately fifty miles of lakeshore there remains much undeveloped land. This report is concerned with these "natural" stretches of shoreline, beach and swamps, and interior lands. Coastal wetlands are treated in Technical Memo #3 and are not discussed in detail in this report. Specific flora and fauna information from Technical Memo #3 is included here, however.

This memo describes general and specific habitats in the Coastal Zone for a variety of plants and animals, many of which are considered endangered. The physi-

cal characteristics of the habitats are described briefly, and the more important or rare and endangered varieties of plants and animals found in the habitat are noted. Two appendices are included which list flora and fauna in the coastal zone by their common as well as their scientific names. The map identifies locations of some of the more interesting and unique flora and fauna in the coastal zone.

THE COASTAL LANDSCAPE

The Lake Ontario shoreline varies considerably in its physiography, soils, and resulting habitats. These habitats in turn contain particular niches where the chemical and physical conditions are proper for the association of individual plant and animal species. The exact conditions needed for these associations are not completely understood, especially for the less showy plants and the more secretive animals.

The extremities of the study area contain bays and ponds with barrier sand beaches. These are dynamic areas in their natural state with major changes observable in short period of time. Presently the western side of Little Sodus Bay and the Pond has been stabilized by artificial breakwaters and retaining walls. At the opposite extremity, North Pond and South Pond are still free to change their contours as lake water levels and interior water runoffs move, remove, and augment sand accumulations. As the resultant dune changes so does vegetation, and the two go hand in hand as the dune builds up, stabilizes and erodes, repeating the cycle. Specialized plants in part are responsible for this process which is depicted in Figure 1.

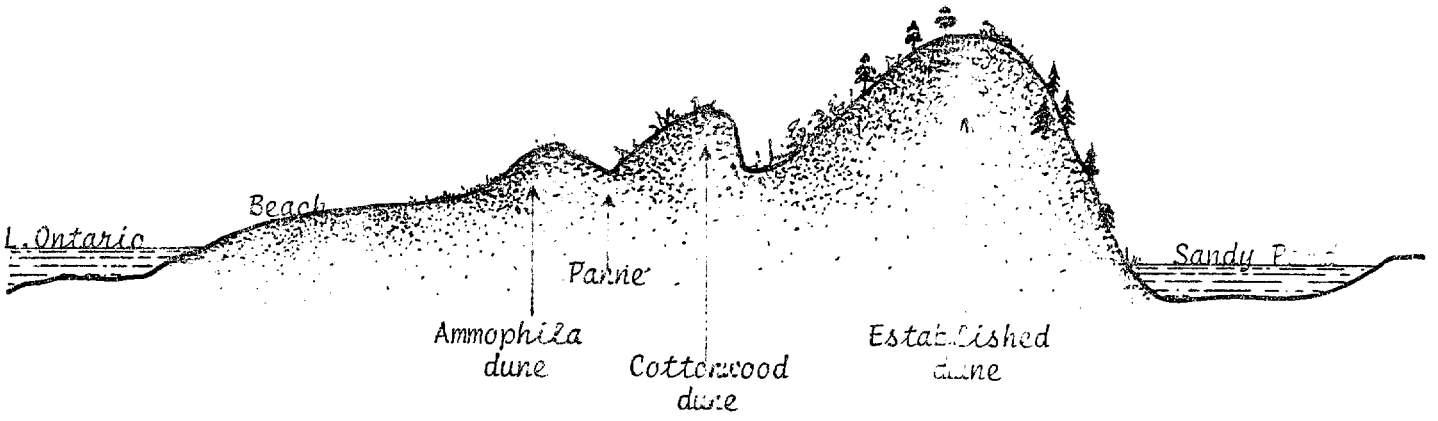
Upland areas immediately adjacent to the above areas consist of eroding bluffs -- now most artifically stabilized -- which are drumlins. The vegetation of these areas differs depending on current use with none of them in their natural state. Again, they are naturally a very dynamic feature of the landscape, the erosion at McIntyres Bluff being particularly striking.

Northeast of Oswego the upland areas consist of a generally flat plain with the soil overlay and subsurface till comprising a not too thick layer over bedrock. This accounts for the rock ledges adjacent to Lake Ontario. This area extends along a stretch of shore in both directions from the Nine Mile Point power plant site.

All upland areas along the lake are surrounded by extensive fresh water wetlands. These marshes vary in character and vegetation, containing different habitats with concurrent differences in flora and fauna. Another variable in these areas is the successional stage with several stages often present in one wetland. Each of these areas is described in the memo on wetlands. These wetlands serve as the mouth and channel for the many streams and rivers that comprise the eastern Lake Ontario drainage basin.

The above concerns itself with the more striking features of the landscape. The entire area under study once consisted of typical Northern forest types found throughout Central New York, although here somewhat modified by the milder climate brought upon by Lake Ontario. The area is mostly rural except for the City of Oswego. Other more densely populated areas are characterized by cottage development along the shore. While most of the changes in the area were initially for agricultural purposes, farming has declined and is in fact still declining to the point where farming no longer is the dominant activity along the lakeshore. As one goes away from the shore, farming activities increase, probably due to less demand for the land rather than inherent agricultural land value differences. The abandonment of farms has lead to vast areas of open space that was once pasture and tilled fields that now are succeeding into brush, followed by second-growth trees that in a few years may return the area to its original wooded state.

PLANT SUCCESSION ON SAND DUNES
as illustrated at
SANDY POND, N.Y. *



1. BEACH
   a. Lower — Plantless
   b. Middle — Succulent annuals
      Cakile (Sea rocket)
   c. Upper — Perennials
      Lathyrus maritimus (Beach pea)
      Biennials
      Artemisia caudata (Tall wormword)
      Annuals
      Euphorbia polygonifolia (Shore spurge)

2. FOREDUNE
   Perennials
   Ammophila breviligulata (Marram grass)
   Populus deltoides (Cottonwood)
   Prunus pumila (Sand cherry)
   Salix syrticola (Furry willow)
   Salix glaucophylla (Broad leaved willow)
   Elymus robustus var. vestitis (Noddijg wild rye)

   Biennials
   Oenothera muricata (Evening primrose)

   Annuals

3. MOVING DUNE
   Many plants of the foredune and established dune.

4. ESTABLISHED DUNE
   Perennials
   a. Evergreens — often on lakeward side.
   b. Deciduous climax trees — often on top and leeward side.

* *By permission of M. E. Faust.*

HABITATS IN THE COASTAL ZONE

A great diversity of wildlife species exists in the coastal areas becuase of a great variety of habitat types. The large wetlands acreages in this area serve as production areas as well as resting and feeding areas for migrating waterfowl. In addition, the area has a distinctive pattern of cultivated crops, grass, shrubs, trees and water areas that make good wildlife habitat. Borders planted or cut along edges of fields and woods provide food and cover. Hedges provide travel lanes, and ponds improve wildlife production and furnish stopover areas for migrating waterfowl.

Wetlands are the single most important type of wildlife habitat in the coastal zone. First, they are the most productive of all types of wildlife habitat; and second, they are the most vulnerable to destruction since they can be drained, diked, filled, or dredged and converted to other types of land or water use. In addition, natural causes such as erosion by wind and water has caused loss and degradation of many of these important wildlife habitats.

The detailed enumeration of all plant species and their densities which make up habitats in the coastal zone is not possible at this time. However, generalized habitats are described in Table I, and specific habitats and areas of note are described in the following section in this technical memo.

Generalized Habitats from the Glossary in
the Application by Rochester Gas and Electric Company
for the Sterling Power Project

Tilled
Regular cultivated areas.

Mowed fields
Grass and forb dominated field that is mowed at regular intervals.

Pasture
A grass and forb dominated area under the influence of grazing pressure.

Early stage old field
An abandoned field in the early stages of succession; dominated by grasses and forbs.

Mature old field
An abandoned field in later stages of succession; contains several shrubs as well as grasses and forbs.

Orchard
A wooded area characterized by an orderly planting of fruit trees.

Scrub
Area dominated by shrubs and other small woody vegetation.

Evergreen
A wooded area composed of coniferous species.

Young Hardwoods
A wooded area of high species diversity with numerous older trees that is undergoing little or no change; climax area.

Hedgerow
A shrub or tree dominated strip of vegetation generally separating cultivated fields.

Wetlands
Lowlands covered with shallow and sometimes temporary or intermittent waters.

SPECIFIC HABITATS AND AREAS OF NOTE

Sandy Pond Dunes (Sandy Creek)

This barrier beach is perhaps the most unique area along the coastal zone. Many of the plants located here are on the master list of rare and/or endangered species. Aside from being an excellent place for migrating and resting birds (especially southward bound shorebirds) this area formerly was one of the few inland nesting areas for the Piping Plover (Charadrius melodus) -- a bluelisted species. Proper regulation of the beach is needed to enable these birds to once again nest here, to assist the Common tern (Sterna hurundo) colonies, and to provide resting area for the migrating shorebirds.

Juniper Hillside (Sandy Creek)

Unusual vegetation and associated communities are found in this area. Prairie warbler (Dendroica discolor) habitat is found here.

Community Park (Sandy Creek)

This is a sand community where interesting vegetation and breeding areas are found for the bluelisted Grasshopper sparrow (Ammodramus savannarum) and the less common Vesper sparrow (Poolcetes graminlus).

Salmon River Valley (Richland)

A. Centerville Area -- This area contains a pine/oak forest and a spruce plantation. Breeding birds include a northern location for Winged warblers, Whip-poor-will (Caprimnlgus vociferns), Hermit thrush (Cathorus guttatus), Magnilia warbler (Dendroica magnolia), and Morning warbler (Dporonis philadelphia).

B. Pineville Bog -- This is a well-preserved floating northern bog that has many new and/or endangered plants resulting in unusual breeding birds.

C. Black Hole -- This is an old river-cut of interest geomorphologically.

Selkirk Shore (Richland)

Although Selkirk Shore is a state park, much destruction of valuable habitat occurs. Stable woods include Black gum (Nyssa syloatica) which runs north along the shore. Many herbs found on the endangered list are found here plus others of interest including Trailing arbutus (Epigaea repens), Hapseed (Phryma leptostack) and Pinwood (Lechea minor). At the pine grove area of the park is the only nesting colony of Pine warblers (Dendroica pinus) in Central New York.

Derby Hill (Mexico)

This area is owned by the nature Conservancy and Onondaga Audobon Society. It is the major hawk watching location in the spring.

Hickory Grove (New Haven)

Unusual southern oak/hickory woods are located here. Many interesting and varied spring wildflowers and ferns exist in this area. Breeding birds include

the bluelisted Red-headed woodpecker (Melanerpes erythrocephalus) and gamebirds Ruffled grouse (Bonasa umbellus) and American woodcock (Scolopox minos).

Pleasant Point (New Haven)

This is one of the most important lake areas for wintering ducks, grebes, and loons.

Shore Oaks Woods (New Haven

The area contains mixed woods with rich understory with many wildflowers. Breeding birds include Barred owl (Strix varia) and Hooded warbler (Wilsonia citrina) in one of their few locations in Central New York.

Ninemile Point (New Haven)

This is a lakeshore wood lot with unusual high rock ledges excellent for spring wildflowers especially Early saxifrange (Saxifroga virginiensis) and Spring beauty (Claytonia sp.). Many migrating land birds use this area. Numerous breeding birds include the only natural nesting area in New York State of Barn swallow (Hirundo rustica), Eastern phobe (Sayorhis phoebe), and American woodcock (Scolojeax minor). Various other birds and Ruffled grouse (Bonasa umbellus) frequent this area in winter.

Parkhurst Road Woods (Scriba)

This is a southern woods of oak/hickory/maple with rich understory. A variety of wildflowers exist including the proscribed cardinal flower (Lobelia cardinalis). The Hooded warbler (Wilsonia citrina) uses this area as one of only a very few nesting areas in Central New York.

Niagara-Mohawk Atomic Plant Area (Scriba)

Rock ledges exist here which may still be used by Barn swallow (Hirundo rustica) for nesting.

Lakeview (Scriba)

This area is used extensively by wintering ducks.

St. Paul's Cemetery (Oswego)

The area near the lake is a major wintering duck area.

Oswego Harbor (Oswego)

This is the most important wintering waterfowl area in the coastal zone with fifty percent of all specimens in Central New York.

Mud Pond (Oswego)

Many rare plants are found in this area, especially orchids.

Sterling Township (Sterling)

A. Parkhurst Road south of Moon Beach has breeding Golden winged warbler (Vermivora chrysoptera) and Red-headed woodpecker (Melanerpes erythrocephalus).

B. North of Sterling Creek east of Trader Road nests the blue-listed Henslow's sparrow (Ammodramus henslowir).

C. The shoreline contains interesting eroding drumlins.

Fair Haven State Park (Sterling)

The woods in the park are a breeding location for southern species including Red-billed woodpecker (Melaneryses carolinus), Tufted titmouse Parus bicolor), Carolina wren (Thryothorus ludovicienus) and Hooded warbler (Wilsonia citrina). The beach, which is threatened by development, contains many rare and/or endangered dune plants ranking second only to Sandy Pond in this respect.

Pond Hundred (Sterling)

The area is flooded in Spring and attracts numerous and varied waterfowl on migration north.

Little Sodus Bay (Sterling)

A. Westside Beach is a fragile shingle beach with willow (Salix sp.) and Dogwood (Carmus sp.). The beach is on a major land migration route.

B. Meadow Cove is an overwintering area for Lalf-landing as there is an abundance of protected bird habitat.

The areas mentioned above are only a few of the many wildlife habitats in the coastal zone. Although in these habitats exist rare and endangered species and unusual or unique animals and vegetation, other habitats not specifically mentioned are habitats for big game, waterfowl, samll game, furbearers, and non-game animals.

Flora

During Phase I, no complete inventory of the plants of the Coastal Zone was possible. For many of the most biologically interesting areas along this stretch of coast, the most characteristic plants have been mentioned. The various marshes are very different from one another both in successional stages and in species composition for relatively the same successional stage.

Appendix A is for the most part compiled from herbarium specimens and other authenticated records from the New York State Museum in Albany. Additional records are noted from work at Sterling, Mud Pond, Pineville, and brief lake-shore reconnaissance in 1975. All species included are either rare or endangered across New York State. Not all endangered species are rare and even some of the rarest ones must be based on state-wide standards as a minimum, although other species might be thought sufficiently unusual locally to warrant protection. More field work is needed here. The species listed in Appendix A are all included because they are on the State and/or Federal lists that are evolving in response to recently enacted endangered species laws. Mr. Stanley J. Smith, Curator of Botany for New York State, has devoted considerable time to the endeavor and was the authority consulted for each species included. Local authorities also gave much useful advice and commentary to this list, and Mildred Faust gave numerous field records as well as spent some additional time in the field. It should be noted that only plants indigenous to the area were considered for the list.

At the present time there seems to be little if any active lumbering going on in this area. Mature hardwood stands containing enough wood to be economical to harvest and market are uncommon. The possible exceptions to this are the wet wooded areas in the boundary of the proposed Sterling Power Project and near the vicinity of Nine Mile Point. In the former, there was timber removed within the last two years, and at the latter, occasional wood is still being removed. These activities probably will decrease even more in coming years as the land is used increasingly for recreation and open space buffers for power plants. No commercially exploitable soft wood is contained in the study area, although a few of the scattered evergreen (mostly red pine) plantations are especially near the southeast corner of Lake Ontario and in certain other locations, but none of these are very large and seem more a buffer and/or wind break than a future source of lumber. No attempt was made to interview current land owners for their intentions in this regard.

The south shore of Lake Ontario has relatively mild climate which makes the area suitable for fruit production. There are still many orchards -- especially apple -- located here with the largest perhaps to the west of Butterfly Swamp. West of Nine Mile Point and west of Oswego there are also remaining orchards.

Fauna

The lists of amphibians, reptiles, and mammals consist of those species thought present or problematical after consulting wtih the standard reference works. Some specific site records have been included, but due to the paucity of published data, the omission of certain species from collections was not thought to be conclusive. Furthermore, many of the species are thought to be rare and most likely being overlooked, as they are secretive and difficult to trap. The Bog turtle, Clemmys muhlenbergii, presents a different case, as this is indeed rare and on the official state endangered species list. No records exist for our area, but whether it does not exist here, has not yet been located here, has been extirpated here, or indeed has been found here but not reported is uncertain. The latter would seem from the desire to prevent additional specimens from becoming pets as removal from the wild has played a part in the decline of this once common species.

From an ornithological point of view, this entire stretch of shoreline is unique resource. Under specific locales some of the reasons for this become apparent, but emphasis is in order. The Lake Ontario shoreline is part of the main bird migration route between northern (boreal forest and tundra) breeding areas and wintering grounds along the coasts (including Lake Ontario) and the south. The fact that birds generally go around rather than across large water bodies such as Lake Ontario makes for even larger concentrations along this shoreline and accounts for the so-called funnelling effect. Those birds that migrate and in certain cases winter in our area require sanctuary and rest. Suitable feeding areas undisturbed by man should be set aside. Certain of these areas should be free of the pressure from hunters to protect both game and non-game species. Migrating birds also need protection from hazards encountered during migration; smokestacks, large towers, and oil and chemical pollution of the waterways may present difficulties. In regard to the latter, water quality at the mouth of the Oswego River including the harbor is particularly important.

This area is also of great importance for breeding species, as it is the transition zone in which many northern and southern species find their extremes of breeding. (Thi is also true of plants, and our great diversity can be attributed in part to the meeting of southern, northern, and coastal types in this

area.) Protection of these birds requires preservation of suitable nesting habitats, especially the increasingly rare wetland types. Some species are intolerant of man whereas others are fairly adaptable. Additional areas other than the wetlands serve the needs of particular species -- sometimes for reasons not completely clear. In the description of particular areas the more critical bird areas are mentioned. It is particularly important to set aside breeding areas for the rarer species. In this context, all bluelisted birds or birds being considered for inclusion to the bluelist that nest or have nested in our area are listed below. These are species that are declining in numbers and are listed by the National Audobon Society as "an early warning system for birds." All species listed are from the list published and updated in American Birds.

Marsh hawk	Circus cyaneus
American kestrel	Falco sparverius
Piping plover	Charadrius melodus
Upland sandpiper	Bartramia longicauda
Yellow-billed cuckoo	Coccyzus americannus
Common nighthawk	Chordeiles minor
Red-headed woodpecker	Melanerpes erythrocephalus
Hairy woodpecker	Piciodes villosus
Purple martin	Progne subis
Short-billed marsh wren	Cistothorus platensis
Eastern bluebird	Sialis sialis
Loggerhead shrike	Lanlius indovicianus
Henslow's sparrow	Ammodramus henslowii
Grasshopper sparrow	Ammodramus savannarum

MANAGEMENT

Various techniques have been used to protect wildlife and vegetation. Most of these methods of management were geared towards game species: birds and animals that were hunted for fur, meat, or sport. In the process, many other species were given sanctuary.

Protection of non-game species and of plants generally requires both protection of suitable habitats as well as leaving the organism alone without noise, trampling, etc. This is seldom easy and only partially successful.

Traditionally, rare plants were protected by what the discoverer thought was benign neglect -- ignore them and hope others will too. This is no longer enough, as people are getting into even the most remote areas either for development or just for recreation. The most respectful pedestrian can trample rare plants; what motor bikes, snowmobiles, and all terrain vehicles do needs not be mentioned here. Setting aside preserves is needed; so is better education. New techniques are also needed or else many of these plants will be extirpated.

The specific reasons why specific plants are rare and/or endangered is probably impossible to tell. In general, the most common reasons are direct destruction and habitat destruction; the latter not necessarily requiring the bulldozer. In addition, it is known that some of these species were never common or some never common in our area, as it is the extreme of their occurrence. Some of the more common plants included on this list are there to prevent them from being dug up by collectors and nursery people. Another reason is that difficulty in identification of the enumerated species with a genuinely rare one makes it worthwhile to protect both of them.

Protection of fauna often involves more than just sanctuaries, as one must decide what sanctuary from what. For example, chemical pollutants discharged miles from the location under consideration, e.g. DDT concentrating in organisms up the food chain, prevent birds from reproducing even if on a sanctuary. Moreover, one needs to know proper territories and sensitivities before some species can survive. The current controversy over ultra-high voltage electrical transmission lines is a case in point. A major problem with many species is the lack of compatibility with man, and secondary effects of man such as the domestic cat as a predator on birds and small animals.

Although domestic cats, chemical pollutants, and exotic species are probably given in the study area, bird life needs more than anything habitat protection and lack of disturbance. Those birds that migrate and in certain cases winter in the study area require sanctuary and rest. Suitable feeding areas undisturbed by man should be set aside. Certain of these areas should be free of the pressure from hunters to protect both game and non-game species. Migrating birds also need protection from hazards encountered during migration: smokestacks, large towers, and oil and chemical pollution of the waterways come immediately to mind. Water quality at the mouth of the Oswego River including the harbor is particularly important.

Birds breeding in the area require preservation of suitable nesting habitats especially of the increasingly rare wetland types. Some species are intolerant of man whereas others are fairly adaptable. Additional areas other than the

wetlands serve the needs of particular species -- sometimes for reasons not completely clear. In the description of particular areas, the more important bird areas are mentioned. It is particularly critical to set aside breeding areas for the rarer species.

Fortunately for most of the wildlife in the study area, man can use areas in ways compatible with the flora and fauna. Sometimes an area just must be closed to man at critical times. This is already done for nesting birds, not only at various refuges, but even at crowded Cape Cod National Seashore. In the case of rare plants, small areas probably need be set aside completely to protect some of these. The limited funds available for land acquisition should be used to purchase these critical areas. In most other cases, proper land use planning and citizen education will protect flora and fauna.

CONCLUSION

Wildlife and vegetation are abundant and varied in the coastal zone. In addition, many species are rare and/or endangered. The flora and fauna require a great diversity of habitats including sand, marshes, brushland, forested wilderness, meadows, rocky ledges, and other variations of vegetation and topography. The coastal zone is of particular concern as it contains the great diversity of habitats needed to protect and enhance wildlife and vegetation. The populations of flora and fauna in the coastal zone can never be considered static. For every habitat change there is a change in the population of wildlife and vegetation.

This technical memo contains appendices which list flora and fauna in the coastal zone. Habitats have also been identified. Only through careful planning and management can the flora and fauna of the coastal zone continue to exist.

Recommendations

1. A complete inventory should be taken of all habitats in the coastal zone.

2. The State should pass an Endangered Species Act to protect endangered plants and animals in New York State.

3. A preserve system should be established to protect all significant wildlife habitats.

4. Potential development sites should be determined as alternatives to development pressures on wildlife habitats.

5. Maintenance of clean waters and air should be as extensive as possible in regions containing important wildlife habitats.

6. The accessibility to the public of good wildlife habitat (for hunting or viewing), along with access to lakes and streams should be expanded taking into account good conservation principles.

FLORA

DIVISION PTERIDOPHYTA

CLASS LYCOPODIINAE

Order Lycopodiales

Family Lycopodiaceae

Bristly clubmoss, Stiff clubmoss *(Lycopodium annotinum pungens*
Interrupted clubmoss
Salmon River valley

Common Clubmoss, Running pine, *(Lycopodium clavatum clavatum)*
Staghorn
Salmon River Valley

Ground cedar, Running pine *(Lycopodium complanatum flabelliform)*
Running cedar
Salmon River Valley, Selkirk Shores, Sterling

Shiny clubmoss *(Lycopodium lucidulum)*
Salmon River Valley, Selkirk Shores

Ground pine, Tree clubmoss *(Lycopodium obscurum)*
Salmon River Valley, Selkirk Shores, Sterling

Ground cedar *Lycopodium tristachyum)*
Selkirk Shores

CLASS ISOETINAE

Order Isoetales

Family Isoetaceae

Spiny-spored quillwort, *(Isoetes echinospora braunii)*
Braun's quillwort
Sandy Pond

CLASS EQUISETINAE

Order Equisetales

Family Equisetaceae

Variegated horsetail *(Equisetum variegatum variegatum)*
Salmon River Mouth, Sandy Pond

CLASS FILICINAE

Order Ophioglossales

Family Ophioglossaceae

Matricary grapefern, Daisyleaf grapefern *(Botrychium matricariaefolium matricariaefolium)*
Sandy Pond, Salmon River Valley, Oswego area

Leathery grapefern *(Botrychium multifium silaifolium)*
Oswego area

Simple grapefern, Dwarf grapefern *(Botrychium simplex simplex*
Oswego area

Rattlesnake fern *(Botrychium virginianum virginianum)*
Salmon River Valley, Oswego area

Addertongue fern *(Ophioglossum vulgatum vulgatum)*
Sandy Pond, Oswego area

Family Osmundaceae
Cinnamon fern *(Osmunda cinnamomea cinnamomea)*
Sandy Pond, Oswego area

Royal fern *(Osmunda regalis spectabilis)*
Sandy Pond, Salmon River mouth, Oswego area, Fair Haven Bog

Family Salviniaceae
Mosquito fern, Water fern *(Azolla caroliniana)*
Little Sodus Bay

Family Polypodiaceae
Maidenhair *(Adiantum pedatum pedatum)*
Salmon River valley

Lady fern *(Athyrium filix-femina asplenioides)*
Sandy Pond, Sterling

Silvery spleenwort *(Athyrium thelypteroides)*
Salmon River valley

Bulblet bladderfern *(Cystopteris bulbifera)*
Salmon River valley

Fragile fern, Common bladderfern *(Cystopteris fragilis mackayii)*
Sandy Pond

Swamp fern, Crested shieldfern *(Dryopteris cristata)*
Salmon River valley

Goldie's fern *(Dryopteris goldiana)*
Salmon River valley

American shieldfern *(Dryopteris intermedia)*
Oswego area

Marginal shieldfern *(Dryopteris marginalis)*
Sandy Pond, Little Sodus Bay

Spinulose shieldfern *(Dryopteris spinulosa)*
Salmon River valley, Sandy Pond, Sterling, Fair Haven campsite

Oak fern *(Gymnocarpium dryopteris)*
Salmon River valley, Sandy Pond

Rock polypody *(Polypodium vulgare virginianum)*
Sandy Pond

Christmas fern *(Polystichum acrostichoides)*
Sandy Pond, Little Sodus Bay, Sterling

Broad beech-fern *(Thelypteris hexagonoptera)*
Salmon River valley, Sandy Pond

New York fern *(Thelypteris noveboracensis)*
Sandy Pond, Little Sodus Bay

Marsh fern *(Thelypteris palustris pubescens)*
Sandy Pond, Salmon River valley, Oswego area, Fair Haven Bog

Blunt-lobed woodsia *(Woodsia obtusa)*
Salmon River valley

Virgina chainfern *(Woodwardia areolata)*
Salmon River valley, Sandy Pond

DIVISION SPERMATOPHYTA

CLASS ANGIOSPERMAE

Sub-class Monocotyledoneae

Order Pandanales

Family Sparganiaceae
Small bur-reed *(Sparganium minimum)*
Little Sodus Bay

Order Najadales

Family Potamogetonaceae
Northern pondweed *(Potamogeton alpinus tenuifolius)*
Salmon River mouth

Vasey's pondweed *(Potamogeton vaseyi)*
Salmon River mouth

Family Najadaceae
Guadalupe naiad *(Najas guadalupensis guadalupensis)*
Sandy Pond, Little Sodus Bay

Order Graminales

Family Gramineae
Beach grass, sea sand-reed *(Ammophila breviligulata)*
Sandy Pond, Selkirk Shores, Little Sodus Bay

(Echinochlos walteri)
Sandy Pond, Salmon River mouth

Lindheimer's panic grass *(Panicum lindheimeri)*
Sandy Pond

Panic grass *(Panicum mattamuskeetense)*
Oswego area

Woodland witch grass *(Panicum philadelphicum tuckermanii)*
Port Ontario, Sandy Pond, Salmon River mouth

Sand dropseed *(Sporobolus cryptandrus fuscicola)*
Sandy Pond, Salmon River mouth, Oswego area, Little Sodus Bay

Narrow false oat *(Trisetum spicatum molle)*
Oswego area

Family Cyperaceae
Creeping sedge *(Carex chordorrhiza)*
Salmon River mouth

Northern bog sedge *(Carex disticha gynocrates)*
Mexico Point

Green sedge *(Carex oederi viridula)*
Little Sodus Bay

Engelmannis cyperus, Galingale *(Cyperus engelmannii)*
Sandy Pond

Rusty galingale *(Cyperus ferruginescens)*
Mud Pond

Coarse galingale *(Cyperus odoratus)*
Oswego area

Schweinitz's cyperus *(Cyperus schweinitzii)*
Little Sodus Bay

Rough cotton grass *(Eriophorum tenellum)*
Sandy Pond
(Fimbristylis autumnalis)
Sandy Pond

Beak-rush *(Rhynochospora macrostachya)*
Mud Pond

Pale great bulrush *(Scirpus heterochaetus)*
Sandy Pond, Selkirk Shores

Red-banded bulrush *(Scirpus rubrotinctus)*
Mud Pond

Water clubrush *(Scirpus subterminalis)*
Mud Pond

Order Arales

Family Araceae
Wild calla, water arum *(Calla palustris*
Salmon River mouth

Family Lemnaceae
Dotter watermeal *(Wolffia punctata)*
Little Sodus Bay

Order Liliales

Family Juncaceae
Alpine rush *(Juncus alpinus nodulosus)*
Sandy Pond, Oswego area, Little Sodus Bay

Jointed rush *(Juncus arcticus littoralis)*
Sandy Pond, Salmon River mouth, Oswego area, Little Sodus Bay

Family Liliaceae
Wood lily *(Lilium philadelphicum philadelphicum)*
Salmon River valley

Wild lily of the valley *(Maianthemum canadense canadense)*
Sandy Pond, Salmon River mouth

Three-leaved false Solomon's seal *(Smilacina trifolia)*
Salmon River valley

Carrion flower *(Smilax lasioneuron)*
Selkirk Shores

Nodding wakerrobin *(Trilium cernum)*
Mud Pond

Red trillium, Stinking Benjamin *(Trillium erectum)*
Sandy Pond, Salmon River valley, Oswego area

Large flowered trillium, *(Trillium grandiflorum)*
White trillium
Selkirk Shores, Oswego area, Fair Haven Campsite

Painted trillium *(Trillium undulatum)*
Sandy Pond, Oswego area

Order Orchidales

Family Orchidaceae
Arethusa, Dragon's mouth *(Arethusa bulbosa)*
Mud Pond

Grasspink *(Calopogon pulchellus)*
Mud Pond

Calypso *(Calypso bulbosa)*
Mud Pond

Spotted coralroot *(Corallorrhiza maculata maculata)*
Salmon River mouth

Late coralroot *(Corallorrhiza odontorrhiza)*
Salmon River valley

Stemless lady-slipper *(Cypripedium acaule)*
Salmon River valley

Ram's head lady-slipper *(Cypripedium arietinum)*
Point Ontario

Rattlesnake plantain *(Goodyera pubescens)*
Sandy Pond, Sterling

Loddige's rattlesnake plantain *(Goodyera tesselata)*
Salmon River valley, Oswego area

Ragged fringed orchid *(Habenaria X andrewsii)*
Salmon River valley

White fringed orchid *(Habenaria blephariglottis blephariglottis)*
Selkirk Shores, Mud Pond

Club-spur orchid, Green *(Habenaria clavellata)*
woodland orchid
Selkirk Shores, Salmon River valley, Mud Pond

Tall white orchid, Tubercled *(Habenaria dilatata)*
orchid
Oswego area

Pale green orchid *(Habenaria flava herbiola)*
Sandy Pond, Oswego area

Hooker's orchid *(Habenaria hookeri)*
Mud Pond

Ragged fringed orchid *(Habenaria lacera)*
Sandy Pond, Oswego area

Round-leaved orchid *(Habenaria orbiculata)*
Salmon River valley

Purple fringed orchid *(Habenaria psycodes psycodes)*
Sandy Pond, Salmon River valley, Oswego area

Loessel's tway-blade *(Liparis loeselii)*
Sandy Pond, Selkirk Shores

White adder's mouth *(Malaxis monophylla brachypoda)*
Salmon River valley

Green adder's mouth *(Malaxis unifolia)*
Selkirk Shores

Showy orchis *(Orchis spectabilis)*
Salmon River valley

Rose pogonia, Snake-mouth *(Pogonia ophioglossoides)*
Sandy Pond, Mud Pond

Autumn ladies' tresses *(Spiranthes cernua cernua)*
Sandy Pond, Selkirk Shores

Sub-class Dicotyledoneae

Order Piperales

Family Saururaceae
Lizard's tail *(Saururus cernuus)*
Selkirk Shores, Oswego area, Little Sodus Bay, Little Salmon River

Order Salicales

Family Salicaceae
Peach-leaf willow *(Salix amygdaloides)*
Sandy Pond

Sandbar willow *(Salix exigua interior)*
Sandy Pond

Dune willow, Broad-leaved willow *(Salix glaucophylloides albrestita)*
Selkirk Shores

Bog willow *(Salix myrtilloides pedicellaris)*
Sandy Pond, Selkirk Shores, Little Sodus Bay

Furry willow *(Salix syrticola)*
Sandy Pond, Selkirk Shores, Port Ontario

Order Polygonales

Family Polygonaceae
Coast jointweed *(Polygonella articulata)*
Sandy Pond

Order Ranunculales

Family Nymphaeaceae
Sweet scented water lily *(Nymphaea odorata)*
Sandy Pond, Mud Pond

Large white water lily *(Nymphaea tuberosa)*
Sandy Pond, Oswego area, Little Sodus Bay

Family Ranunculaceae
Spearwort *(Ranunculus ambigens)*
Oswego area, Salmon River valley

Order Papaverales

Family Cruciferae
Rock cress *(Arabis divaricarpa)*
Sandy Pond

Lake cress *(Armoracia aquatica)*
Oswego area

Sea rocket *(Cakile edentula lacustris)*
Sandy Pond, Selkirk Shores, Oswego area, Little Sodus Bay

Order Sarraceniales

Family Sarraceniaceae
Pitcher plant, Sidesaddle flower *(Sarracenia purpurea purpurea)*
Sandy Pond, Salmon River valley, Pineville bog

Family Droseraceae
Spatulate-leaved sundew *(Drosera intermedia)*
Sandy Pond, Fair Haven Bog

Round-leaved sundew *(Drosera rotundifolia)*
Sandy Pond, Selkirk Shores

Order Rosales

Family Rosaceae
Thicket serviceberry *(Amelanchier canadensis)*
Oswego area

Running serviceberry *(Amelanchier stolonifera)*
Salmon River valley

Bushy cinquefoil *(Potentilla paradoxa)*
Little Sodus Bay

Sand cherry *(Prunus pumila pumila)*
Sandy Pond, Selkirk Shores, Salmon River valley

American mountain ash *(Pyrus americana)*
Salmon River valley

Showy mountain ash *(Pyrus decora)*
Selkirk Shores

Purple chokeberry *(Pyrus floribunda)*
Sandy Pond, Selkirk Shores

Order Umbellales

Family Araliaceae
Ginseng *(Panax quinquefolius)*
Salmon River valley

Family Umbelliferae
Many-flowered marsh pennywort *(Hydrocotyle umbellata)*
Oswego area

Family Nyssaceae
Sour gum, Black gum *(Nyssa sylvatica sylvatica)*
Sandy Pond, Oswego area, Selkirk Shores

Order Ericales

Family Pyrolaceae
Spotted wintergreen *(Chimphila maculata)*
Salmon River valley

Prince's pine *(Chimphila umbellata cisatlantica)*
Selkirk Shores

Family Monotropaceae
Pine drops *(Pterospora andromedea)*
Selkirk Shores

Family Ericaceae
Bog rosemary *(Andromeda polifolia glaucophylla)*
Selkirk Shores, Mud Pond, Pinewille bog, Fair Haven bog

Bearberry *(Arctostaphylos uva-ursi coactilis)*
Sandy Pond

Bog Laurel, Swamp laurel *(Kalmia polifolia polifolia)*
Selkirk Shores, Mud Pond

Labrador tea *(Ledum palustre groenlandicum)*
Selkirk Shores, Pineville bog

Highbush blueberry *(Vaccinium corymbosum atrococcum)*
Sandy Pond

Order Primulales

Family Primulaceae
Loosestrife *(Lysimachia X producta)*
Sandy Pond

Water pimpernel *(Samolus valerandi parviflorus)*
Salmon River valley, Oswego area

Order Gentianales

Family Gentianaceae

Family Leguminosae
Milk vetch *(Astragalus canadensis canadensis)*
Little Sodus Bay

Wild indigo *(Baptisia tinctoria tinctoria)*
Selkirk Shores

Order Geraniales

Family Euphorbiaceae
Slender three-seeded mercury *(Acalypha gracilens)*
Oswego area

Seaside spurge *(Euphorbia polygonifolia)*
Sandy Pond, Selkirk Shores, Port Ontario, Oswego area, Little Sodus Bay

Order Sapindales

Family Aquifoliaceae
American holly *(Ilex opaca)*
Sandy Pond, Selkirk Shores, Derby Hill swamp, Oswego area

Family Celastraceae
American bittersweet *(Celastrus scandens)*
Sandy Pond

Order Violales

Family Cistaceae
Rockrose *(Helianthemum canadense)*
Sandy Pond

Order Myrtales

Family Thymelaeaceae
Atlantic leatherwood *(Dirca palustris)*
Salmon River valley

Family Elaeagnaceae
Shepherdia, Buffalo berry *(Shepherdia canadensis)*
Selkirk Shores, Salmon River mouth, Oswego area

Family Lythraceae
Blue waxweed *(Cuphea petiolata)*
Oswego area

Family Haloragaceae
Milfoil *(Myriophyllum heterophyllum)*
Sandy Pond, Selkirk Shores

Milfoil *(Myriophyllum tenellum)*
Sandy Pond

Yellow bartonia, Screwstem *(Bartonia virginica)*
Salmon River valley

Closed gentian *(Gentiana clausa)*
Sandy Pond

Fringed gentian *(Gentiana crinita)*
Selkirk Shores

Stiff gentian *(Gentiana quinquefolia quinquefolia)*
Selkirk Shores

Floating heart *(Nymphoides cordatum)*
Sandy Pond

Family Asclepiadaceae
Poke milkweed *(Asclepias exaltata)*
Sandy Pond, Oswego area

Butterfly weed *(Asclepias tuberosa)*
Sandy Pond

Order Polemoniales

Family Hydrophyllaceae
Broad-leaved waterleaf *(Hydrophyllus canadense)*
Salmon River valley

Family Labiatae
Horsemint *(Monarda punctata villicaulis)*
Sandy Pond, Selkirk Shores

Hedge nettle *(Stachys tenuifolia tenuifolia)*
Oswego area, Little Sodus Bay

Family Solanaceae
Tall hairy ground cherry *(Physalis pruinosa)*
Oswego area

Family Scrophulariaceae
Small flowered gerardia *(Agalinis paupercula borealis)*
Sandy Pond, Selkirk Shores, Salmon River mouth, Mud Pond, Little Sodus Bay

Small flowered gerardia *(Agalinis paupercula paupercula)*
Sandy Creek

Family Lentibulariaceae
Humped bladderwort *(Utricularia gibba)*
Sandy Pond

Reclined bladderwort *(Utricularia resupinata)*
Mud Pond

Family Orobanchaceae
Squawroot *(Conopholis americana)*
Oswego area

Broom-rape, Cancer-root *(Orobanche uniflora uniflora)*
Oswego area

Family Acanthaceae
Water willow *(Justicia americana)*
Sandy Pond, Oswego area, Little Sodus Bay

Order Rubiales

Family Rubiaceae
Fringed houstonia *(Hedyotis canadensis)*
Oswego area

Family Caprifoliaceae
American twin-flower, Deer vine *(Linnaea borealis americana)*
Sandy Pond

Wild honeysuckle, Smooth-leaved honeysuckle *(Lonicera dioica glaucescens)*
Sandy Pond, Fair Haven

Swamp fly honeysuckle *(Lonicera oblongifolia)*
Selkirk Shores, Mud Pond

Order Campanulales

Family Campanulaceae
Cardinal flower *(Lobelia cardinalis cardinalis)*
Sandy Pond, Oswego area

Family Compositae
Tailed aster *(Aster caudata)*
Sandy Pond, Selkirk Shores, Port Ontario, Oswego area, Little Sodus Bay

Rush aster *(Aster junciformis)*
Sandy Pond

Water marigold *(Bidens beckii)*
Sandy Pond, Selkirk Shores

Small beggarticks *(Bidens discoidea)*
Sandy Pond, Oswego area

Canada hawkweed *(Hieracium kalmii)*
Sandy Pond

Sweet coltsfoot *(Petasites palmata)*
Oswego area

Riverbank goldenrod *(Solidago purshii)*
Sandy Pond, Oswego area

CLASS AMPHIBIA

Order Caudata

Family Proteidae

Mudpuppy *(Necturus maculosus*

Uncommon resident in permanent water bodies, under diverse conditions along Lake Ontario shore areas

Specimen from North Fair Haven (1913); numerous Sodus Bay to west

Family Salamandridae

Red-spotted or common newt *(Diemictylus viridescens viridescens)*

Common resident in shallow permanent or semi-permanent water and moist upland forests; seen at Sterling

Family Ambystomidae

Jefferson salamander *(Ambystoma jeffersonianum)*

Seldom seen but probably common resident in deciduous woods bordering swamps and slow streams; secretive; nocturnal; very abundant in some areas of Wayne County; seen at Sterling

Blue-spotted salamander *(Ambystoma laterale)*

Very similar to above and in fact considered same species until quite recently; seen at Sterling

Spotted salamander *(Ambystoma maculatum)*

Probably less common than above two species although more records as conspicuous; specimens numerous from Wayne County including Blind Sodus Bay; seen at Sterling

Family Plethodontidae

Northern dusky salamander *(Desmognathus fuscus fuscus)*

Abundant brooks, springs, seepages; specimens from Auburn and Duck Lake although undoubtedly rare if not absent from sandy areas along eastern Lake Ontario

Allegheny mountain salamander *(Desmognathus ochrophaeus)*

More terrestrial than above; problematical in our area although many records from lakeshore near Rochester

Red-backed salamander *(Plethodon cinereus cinereus)*

Terrestrial; found in even fairly dry woods; common resident Specimens from Blind Sodus Bay and Duck Lake; seen at Sterling

Slimy salamander *(Plethodon glutinosus glutinosus)*

Probably uncommon resident in moist wooded ravines and hillsides recorded from Duck Lake

(Eastern) four-toed salamander *(Hemidactylium scutatum)*

Inconspicuous and seldom observed probably uncommon resident; terrestrial adjacent to sphagnum bogs, swamps, woods, etc. Specimens near Oswego (1919) and Duck Lake (1916)

Northern spring salamander *(Gyrinophilus porphyriticus porphyriticus)*
(Purple salamander)
Probably extremely rare in our area in cool springs, wet areas, and surrounding woods; "across state rare in sandy areas along south shore Lake Ontario" (Bishop, 1941)

Northern two-lined salamander *(Eurycea bislineata bislineata)*
Common along brooks

Order Salientia

Family Bufonidae
American toad *(Bufo americanus)*
Abundant all habitats; seen at Sterling

Fowler's toad *(Bufo woodhousei fowleri)*
Rare if at all; prefers sandy areas along river, stream or lake beaches

Family Hylidae
Western chorus frog *(Pseudacris triseriata triseriata)*
Adaptable and occurs in places on irregular basis; needs shallow water for early lifecycle; Wright and Wright mention it along Lake Ontario; seen at Sterling

Eastern gray treefrog (tree toad) *(Hyla versicolor)*
Uncommon resident; found on small trees or shrubs in water; Sterling

Northern spring peeper *(Hyla crucifer crucifer)*
Common resident in woodlands especially those cut over, brushy near water

Family Ranidae
Bull frog *(Rana catesbeiana)*
Common resident of larger sluggish lakes and ponds; seen at Sterling

Green frog *(Rana clamitans melanota)*
Abundant along all watercourses; seen at Sterling

Pickerel frog *(Rana palustris)*
Common resident; needs cool water to breed; wanders over grassy or weedy areas

Northern leopard frog *(Rana pipiens pipiens)*
Common resident meadow frog; seen at Sterling

Mink frog *(Rana septentrionalis)*
Rare resident in cold water ponds and lakes; associates with water lilies

Wood frog *(Rana sylvatica)*
Common resident moist wooded areas; seen at Sterling

CLASS MAMMALIA

Order Marsupialia

Family Didelphidae
Opossum *(Didelphis marsupialis)*
Common and increasing resident; farm areas, woodlots, along streams; seen at Sterling

Order Insectivora

Family Talpidae
Hairytail mole *(Parascalops breweri)*
Common in sandy loam areas with good cover in both open and wooded situations; seen at Sterling

Starnose mole *(Condylura cristata)*
Common in low wet ground near lakes or streams; seen at Sterling

Family Soricidae
Masked (common) shrew *(Sorex cinereus)*
Common in cool, moist situations; seen at Sterling

Smokey shrew *(Sorex fumeus)*
Uncommon in cool birch and hemlock understory

Longtail (big-tailed) shrew *(Sorex dispar)*
Uncommon although locally abundant in cool, moist, rocky wooded areas

Northern water shrew *(Sorex palustris)*
Uncommon along Lake Ontario although common in bogs and cold stream banks

Pygmy shrew *(Microsorex hoyi)*
Rare although this is likely more a function of difficulty in trapping: widespread habitats

Least shrew *(Cryptotis parva)*
Rare: grassy areas and marshes

Shorttail shrew *(Blarina brevicauda)*
Abundant in nearly all habitats; seen at Sterling

Order Chiroptera

Family Vespertilionidae
Little brown myotis (bat) *(Myotis lucifugus)*
Common; roosts caves, hollow trees, buildings; feeds near water or forests; migratory

Keen myotis *(Myotis keeni)*
Uncommon but as roosts in places such as above but singly it is harder to locate; feeds forested areas; hibernates

Indiana myotis *(Myotis sodalis)*
Rare; roosts as above; hibernates in colonies in caves

Small-footed myotis *(Myotis subulatus)*
Uncommon; probably migratory; habits similar to *Myotis keeni*

Silver-haired bat *(Lasionycteris noctivagans)*
Solitary; migratory; forested areas preferably along lakes and streams

Eastern pipistrel *(Pipistrellus subflavus)*
Uncommon; hibernates; habits similar to *Myotis lucifugus*

Big brown bat *(Eptesicus fuscus)*
Uncommon; semihibernates; habits similar to *Myotis keeni*

Red bat *(Lasiurus borealis)*
Uncommon; migratory; wooded areas

Hoary bat *(Lasiurus cinereus)*
Uncommon; migratory; wooded areas

Order Carnivora

Family Procyonidae
Raccoon *(Procyon lotor)*
Common; wooded or rocky cliffs along stream and lake borders; valued fur
Seen at Sterling

Family Mustelidae
Shorttail weasel *(Mustela ermina)*
Common; brushy or wooded areas near water

Longtail weasel *(Mustela frenata)*
Common; habitat not restricted; seen at Sterling

Mink *(Mustela vison)*
Common; along streams and lakes; valued fur

River otter *(Lutra canadensis)*
Uncommon; along streams and lakes; valued fur

Striped skunk *(Mephitis mephitis)*
Common; semi-open areas not too far from water; valued fur; seen at Sterling

Family Canidae
Coyote *(Canis latrans)*
Uncommon but increasing; several records along Lake Ontario west of region (Hamilton, 1943)

Red fox *(Vulpes fulva)*
Common; game animal; mixed forest and open areas; seen at Sterling

Gray fox *(Urocyon cinereoargenteus)*
Uncommon but range expanding northward (de Vos, 1964); open forests

Family Felidae
Bobcat *(Lynx rufus)*
Uncommon although elusive; swamps and open deciduous forests

Order Rodentia

Family Sciuridae
Woodchuck (Ground hog) *(Marmota monax)*
Common; open woods, brush; seen at Sterling

Eastern Chipmunk *(Tamias striatus)*
Common; deciduous forests, brush; seen at Sterling

Eastern gray squirrel *(Sciurus carolinensis)*
Uncommon; hardwood forests, river bottoms; seen at Sterling

Red squirrel *(Tamiasciurus hudsonicus)*
Uncommon; swamps, mixed hardwoods; seen at Sterling

Southern flying squirrel *(Glaucomys volans)*
Uncommon; mostly deciduous wooded areas

Northern flying squirrel *(Glaucomys sabrinus)*
Uncommon; mostly coniferous wooded areas

Family Castoridae
Beaver *(Castor canadensis)*
Increasingly common; streams or lakes near alder or trees; valued fur; seen at Sterling

Family Cricetidae
Deer mouse *(Peromyscus maniculatus)*
Common all dry land habitats; apparently both subspecies; *Peromyscus maniculatus gracilis* woodland and *Peromyscus maniculatus bairdi* prairie; latter has most northerly and easterly New York record from North Pond (Sandy Pond) (Whitaker and Goodwin, 1960); seen at Sterling

White-footed mouse *(Peromyscus leucopus)*
Uncommon; wooded or brushy areas; seen at Sterling

Southern bog lemming *(Synaptomys cooperi)*
Uncommon but great yearly variation; vegetated damp bogs and meadows

Boreal redback vole *(Clethrionomys gapperi)*
(Red-backed mouse)
Uncommon; damp woods

Meadow vole (mouse) *(Microtus pennsylvanicus)*
Common; wide-spread although less likely in forests; North Pond (Whitaker and Goodwin, 1960); seen at Sterling

Pine vole (mouse) *(Pitymys pinetorum)*
Uncommon; deciduous forest floor with thick litter

Muskrat *(Ondatra zibethica)*
Common; marshes, pond, lake, stream edges; especially common Butterfly marsh; valued fur; seen at Sterling

Family Muridae
Norway rat *(Rattus norvegious*
Common about habitated areas; introduced; seen at Sterling

House mouse *(Mus musculus)*
As above; seen at Sterling

Family Zapodidae
Meadow jumping mouse *(Zapus hudsonius)*
Common; various habitats prefers low meadows; North Pond (Whitaker and Goodwin, 1960); seen at Sterling

Woodland jumping mouse *(Napaeozapus insignis)*
Uncommon; forest or brush near water; seen at Sterling

Family Erethizontidae
Porcupine *(Erethizon dorsatum)*
Common; forests usual, brush acceptable

Order Lagomorpha

Family Leporidae
Snowshoe (varying) hare *(Lepus americanus)*
Formerly common, probably exterpated but perhaps coming back (de Vos, 1964); swamps, forests, thickets; game mammal

European hare *(Lepus europaeus)*
Rare introduced; open areas; game mammal

Eastern cottontail *(Sylvilagus floridanus)*
Common; heavy brush, swamp areas; most important small game mammal; seen at Sterling

Order Artiodactyla

Family Cervidae
Whitetail deer *(Odocoileus virginianus)*
Uncommon; forests, swamps, open brush; most important large game mammal; seen at Sterling

CLASS REPTILIA

Order Chelonia

Family Chelydridae
Common snapping turtle *(Chelydra serpentina)*
Common resident all water areas; spends most of time on bottom; seen at Sterling

Family Kinosternidae
Stinkpot (Common musk turtle) *(Sternotherus odoratus)*
Authorities differ if present along Lake Ontario; bottom crawler rarely leaving water

Family Emydidae

Spotted turtle *(Clemmys guttata)*
Common resident at home land or in water; most frequently bogs and marshy pastures

Bog turtle *(Clemmys muhlenbergii)*
Endangered and extremely rare; may still exist in areas of slow moving water in streams, swamps, etc.; needs muddy bottom; range fragmented

Wood turtle *(Clemmys insculpta)*
Uncommon but widespread resident all inland terrain; our most terrestrial turtle

Box turtle *(Terrapene carolina)*
Problematical in our area; scattered New York records lead authorities to disagree; in open woodland, water, mud

Map turtle *(Graptemys geographica)*
Formerly abundant before habitat destruction and pollution; now seems rare but hard to capture; likes large lakes and rivers, basks; seen at Sterling

Midland painted turtle *(Chrysemys picta marginata)*
Common resident in slow moving shallow water; conspicuous; basks; probably our most common turtle

Blanding's turtle *(Emydoidea blandingii)*
Probably rare in our area; spotty distribution leads authorities to disagree; aquatic or on land in wet places near slow moving shallow water

Family Trionychidae

Eastern spiny softshell *(Trionyx spiniferus spiniferus)*
Rare resident; variety of aquatic habitats quiet water, sand bars, and mud flats preferred; basks

Order Squamata

Family Scincidae

Northern coal skink *(Eumeces anthracinus anthracinus)*
Problematical in our area; wet wooded hillsides, creek valley rock overlooks

Family Colubridae

Northern black racer (Black snake) *(Coluber constrictor constrictor)*
Locally abundant resident; uses varied habitats; when alarmed escapes into bushes and low trees

Northern (Eastern) rinkneck snake *(Diadophis punctatus edwardsi)*
Common resident; secretive; woodland areas with wood debris and/or rocks

Black rat snake *(Elaphe obsoleta obsoleta)*
Uncommon resident; prefers coastal farmlands; climbs

Eastern milk snake *(Lampropeltis doliata triangulum)*
Uncommon resident; fields, woodlands, rocky hillsides, river bottoms; seen at Sterling

Northern water snake *(Natrix sipedon sipedon)*
Widespread resident in all water areas; seen at Sterling

Eastern smooth green snake *(Opheodrys vernalis vernalis)*
Uncommon resident; grassy rocky meadows

Northern brown (DeKay's) snake *(Storeria dekayi dekayi)*
Common resident; found in urban areas, around bogs, swamps, in woods

Northern red-bellied snake *(Storeria occipitomaculata)*
Common resident although spotty distribution; secretive

Eastern ribbon snake *(Thamnophis sauritus sauritus)*
Uncommon resident; semi-aquatic

Eastern (Common) garter snake *(Thamnophis sirtalis sirtalis)*
Common resident; widely distributed; seen at Sterling

Family Crotalidae
Timber rattlesnake *(Crotalus horridus horridus)*
Most likely exterpated from area; prefers oak-pine woods, south facing rocky ledges

Eastern massasauga *(Sistrurus catenatus catenatus)*
Problematical irregular visitant to bogs and swamps

CLASS AVES

Order Gaviiformes

Family Gaviidae
Common loon *(Gavia immer)* — tramsient (t)
Red-threated loon *(Gavia stallata)* — t

Order Podicipediformes

Family Podicipedidae
Red-necked grebe *(Podiceps grisegena)* — t
Horned grebe *(Podiceps auritus)* — t
Pied-billed grebe *(Podilymbus podiceps)* — breeds (b)

Order Procellariiformes

Family Procellariidae
Northern fulmar *(Fumaris glacialis)* — t

Order Pelecaniformes

Family Phalacrocoracidae

Great cormorant *(Phalacrocorax carbo)* t
Double-crested cormorant *(Phalacrocorax auritus)* t

Order Ciconiiformes

Family Ardeidae
Great blue heron *(Ardea herodias)* t
Green heron *(Butorides virescens)* b
Little blue heron *(Florida caerulea)* t
Cattle egret *(Bubulens ibis)* t
Great egret *(Casmerodius albus)* t
Snowy egret *(Egretta thula)* t
Black-crowned night heron *(Nycticorax nycticorax)* t
American bittern *(Botaurus lentiginosus)* b
Least bittern *(Ixobrychus exilis)* b

Family Threskiornithidae
Glossy ibis *(Plegadis falcinellus)* t

Order Anseriformes

Family Anatidae
Mute swan *(Cygnus olor)* t
Whistling swan *(Olor columbianus)* t
Canada goose *(Branta canadensis)* t
Brant *(Branta bernicla)* t
Snow goose *(Chen caerulescens)* t
Mallard *(Anas platyrhynchus)* b
Black duck *(Anas rubripes)* b
Gadwall *(Anas strepera)* t
Pintail *(Anas acuta)* t
Green-winged teal *(Anas crecca)* t
Blue-winged teal *(Anas discers)* b
European wigeon *(Anas penelope)* t
American wigeon *(Anas americana)* t
Northern shoveler *(Anas clypeata)* t
Wood duck *(Aix sponsa)* b
Redhead *(Aythya americana)* t
Ring-necked duck *(Aythya collaris)* t
Canvasback *(Aythya valisineria)* t
Greater scaup *(Aythya marila)* t
Lesser scaup *(Aythya affinis)* t
Tufted duck *(Aythya fuligula)* t
Common goldeneye *(Bucephala clangula)* t
Barrow's goldeneye *(Bucephala islandica)* t
Bufflehead *(Bucephala albeola)* t
Oldsquaw *(Clangula hyemalis)* t
Harlequin duck *(Histrionicus histrionicus)* t
Common eider *(Somateria mollissima)* t
King eider *(Somateria spectabilis)* t
White-winged scoter *(Melanitta deglandi)* t
Surf scoter *(Melanitta perspicillata)* t

Black scoter *(Melanitta nigra)*	t
Ruddy duck *(Oxyura jamaicensis)*	t
Hooded merganser *(Lophodytes cucullatus)*	t
Common merganser *(Mergus merganser)*	t
Red-breasted merganser *(Mergus serrator)*	t

Order Falconiformes

Family Cathartidae	
Turkey vulture *(Cathartes aura)*	t
Black vulture *(Coragyps atratus)*	t
Family Accipitridae	
Goshawk *(Accipiter gentilis)*	b
Sharp-shinned hawk *(Accipiter striatus)*	t
Cooper's hawk *(Accipiter cooperii)*	t
Red-tailed hawk *(Buteo jamaicensis)*	b
Red-shouldered hawk *(Buteo lineatus)*	t
Broad-winged hawk *(Buteo platypterus)*	t
Swainson's hawk *(Buteo swainsoni)*	t
Rough-legged hawk *(Buteo lagopys)*	t
Golden eagle *(Aguila chrysaetos)*	t
Bald eagle *(Haliaeetus leucocephalus)*	formerly b
Marsh hawk *(Circus cyaneus)*	formerly b
Family Pandionidae	
Osprey *(Pandeion haliaetus)*	t
Family Accipitridae	
Bald eagle *(Haliaeetus leucocephalus)*	formerly b
Marsh hawk *(Circus cyaneus)*	formerly b
Sharp-shinned hawk *(Accipiter striatus)*	t
Cooper's hawk *(Accipiter cooperii)*	t
Northern geshawk *(Accipiter gentilis)*	b
Red-tailed hawk *(Buteo jamaicensis)*	b
Red-shouldered hawk *(Buteo lineatus)*	t
Broad-winged hawk *(Buteo platypterus)*	t
Swainson's hawk *(Buteo swainsoni)*	t
Rough-legged hawk *(Buteo lagopus)*	t
Golden eagle *(Aguila chrysaetos)*	t
Family Falconidae	
Gyrfalcon *(Falco rusticolus)*	t
Peregrine falcon *(Falco peregrinus)*	t
Merlin *(Falco columbarius)*	t
American kestrel *(Falco sparverius)*	b

Order Galliformes

Family Phasianidae	
Ring-necked pheasant *(Phasianus colchicus)*	b
Family Tetraonidae	
Ruffed grouse *(Bonasa umbellus)*	b

Great black-backed gull *(Larus marinus*	t
Lesser black-backed gull *(Larus fuscus*	t
Herring gull *(Larus argentatus)*	t
Thayer's gull *(Larus thayeri)*	t
Ring-billed gull *(Larus delawarensis)*	t
Laughing gull *(Larus atricilla)*	t
Franklin's gull *(Larus pipixcan)*	t
Bonaparte's gull *(Larus philadelphia)*	t
Black-headed gull *(Larus ridibundus)*	t
Little gull *(Larus minutus)*	t
Black-legged kittiwake *(Larus tridactylus)*	t
Forster's tern *(Sterna forsteri)*	t
Common tern *(Sterna hirundo)*	b
Caspian tern *(Sterna caspia)*	t
Black tern *(Chlidonias niger)*	b

Order Columbiformes

Family Columbidae

Rock dove *(Columba livia)*	b
Mourning dove *(Zenaida macroura)*	b

Order Cuculiformes

Family Cuculidae

Yellow-billed cuckoo *(Coccyzus americanus)*	b
Black-billed cuckoo *(Coccyzus erythropthalmus)*	b

Order Strigiformes

Family Strigidae

Screech owl *(Otus asio)*	b
Great horned owl *(Bubo virginianus)*	b
Snowy owl *(Nyctea scandiaca)*	t
Barred owl *(Strix varia)*	b
Long-eared owl *(Asio otus)*	t
Short-eared owl *(Asio flammeus)*	t
Boreal owl *(Aegolius funereus)*	t
Saw-whet owl *(Aegolius acadicus)*	b

Order Caprimulgiformes

Family Caprimulgidae

Whip-poor-will *(Caprimulgus vociferus)*	b
Common nighthawk *(Chordeiles minor)*	b

Order Apodiformes

Family Apodidae

Chimney swift *(Chaetura pelagica)*	b

Family Trochilidae

Ruby-throated hummingbird *(Archilochus colubris)*	b

Order Coraciiformes

Family Alcedinidae
Belted kingfisher *(Ceryle alcyon)* b

Order Piciformes

Family Picidae
Common flicker *(Colaptes auratus)* b
Pileated woodpecker *(Dryocopus pileatus)* b
Red-bellied woodpecker *(Melanerpes carolinus)* b
Red-headed woodpecker *(Melanerpes erythrocephalus)* b
Yellow-bellied sapsucker *(Sphyrapicus varius)* t
Hairy woodpecker *(Picoides villosus)* b
Downy woodpecker *(Picoides pubescens)* b

Order Passeriformes

Family Tyrannidae
Eastern kingbird *(Tyrannus tyrannus)* b
Western kingbird *(Tryannus verticalis)* t
Great crested flycatcher *(Myiarchus crinitus)* b
Eastern phoebe *(Sayornis phoebe)* b
Yellow-bellied flycatcher *(Empidonax flaviventris)* t
Willow flycatcher *(Empidonax traillii)* b
Alder flycatcher *(Empidonax alnorum)* b
Least flycatcher *(Empidonax minimus)* b
Eastern wood pewee *(Contopus virens)* b
Olive-sided flycatcher *(Contopus borealis)* t

Family Alaudidae
Horned lark *(Eremophila alpestris)* b

Family Hirundinidae
Tree swallow *(Tachycineta bicolor)* b
Bank swallow *(Riparia riparia)* b
Rough-winged swallow *(Stelgidopteryx ruficollis)* b
Barn swallow *(Hirundo rustica)* b
Cliff swallow *(Hirundo pyrrhonota)* b
Purple martin *(Progne subis)* b

Family Corvidae
Blue jay *(Cyanocitta cristata)* b
Common raven *(Corvus corax)* t
American crow *(Corvus brachyrhynchos)* b

Family Paridae
Black-capped chickadee *(Parus atricapillus)* b
Boreal chickadee *(Parus hudsonicus)* t
Tufted titmouse *(Parus bicolor)* b

Family Sittidae
White-breasted nuthatch *(Sitta carolinensis)* b
Red-breasted nuthatch *(Sitta canadensis)* b

Family Certhiidae
Brown creeper *(Certhia familiaris)* b

Family Troglodytidae
House wren *(Troglodytes aedon)* b
Winter wren *(Troglodytes troglodytes)* t
Carolina wren *(Thryothorus ludovicianus)* b
Long-billed marsh wren *(Cistothorus palustris)* b
Short-billed marsh wren *(Cistothorus platensis)* b

Family Mimidae
Gray catbird *(Dumetella carolinensis)* b
Brown thrasher *(Toxostoma rufum)* b
Common mockingbird *(Mimus polyglottos)* t

Family Turdidae
American robin *(Turdus migratorius)* b
Wood thrush *(Catharus mustelinus)* b
Hermit thrush *(Catharus guttatus)* b
Swainson's thrush *(Catharus ustulatus)* t
Gray-cheeked thrush *(Catharus minimus)* t
Veery *(Catharus fuscescens)* b
Eastern bluebird *(Sialia sialis)* b

Family Sylviidae
Blue-gray gnatcatcher *(Polioptila caerula)* b
Golden-crowned kinglet *(Regulus satrapa)* t
Ruby-crowned kinglet *(Regulus calendula)* t

Family Motacillidae
Water pipit *(Anthus spinoletta)* t

Family Bombycillidae
Bohemian waxwing *(Bombycilla garrulus)* t
Cedar waxwing *(Bombycilla cedrorum)* b

Family Laniidae
Northern shrike *(Lanius excubitor)* t
Loggerhead shrike *(Lanius ludovicianus)* b

Family Vireonidae
Yellow-throated vireo *(Vireo flavifrons)* b
Solitary vireo *(Vireo solitarius)* t
Red-eyed vireo *(Vireo olivaceus)* b
Philadelphia vireo *(Vireo philadelphicus)* t
Warbling vireo *(Vireo gilvus)* b

Family Parulidae
Black-and-white warbler *(Mniotilta varia)* b
Blue-winged warbler *(Vermivora pinus)* b
Golden-winged warbler *(Vermivora chrysoptera)* b
Orange-crowned warbler *(Vermivora celata)* t
Tennessee warbler *(Vermivora peregrina)* t
Nashville warbler *(Vermivora ruficapilla)* b
Northern parula *(Parula americana)* t
Yellow warbler *(Dendroica petechia)* b
Magnolia warbler *(Dendroica magnolia)* b

Cape may warbler *(Dendroica tigrina)*	t
Black-throated blue warbler *(Dendroica caerulescens)*	t
Yellow-rumped warbler *(Dendroica coronata)*	b
Black-throated green warbler *(Dendroica virens)*	b
Cerulean warbler *(Dendroica cerulea)*	b
Blackburnian warbler *(Dendroica fusca)*	b
Chestnut-sided warbler *(Dendroica pensylvanica)*	b
Bay-breasted warbler *(Dendroica castanea)*	t
Blackpoll warbler *(Dendroica striata)*	t
Pine warbler *(Dendroica pinus)*	b
Prairie warbler *(Dendroica discolor)*	t
Palm warbler *(Dendroica palmarum)*	t
Oven bird *(Seiurus aurocapillus)*	b
Northern waterthrush *(Seiurus noveboracensis)*	b
Louisiana waterthrush *(Seiurus motacilla)*	t
Mourning warbler *(Oporornis philadelphia)*	b
Connecticut warbler *(Oporornis agilis)*	t
Common yellowthroat *(Geothlypis trichas)*	b
Hooded warbler *(Wilsonia citrina)*	b
Wilson's warbler *(Wilsonia pusilla)*	t
Canada warbler *(Wilsonia canadensis)*	b
American redstart *(Setophaga ruticilla*	b

Family Icteridae

Bobolink *(Dolichonyx oryzivorus)*	b
Eastern meadowlark *(Sturnella magna)*	b
Western meadowlark *(Sturnella neglecta)*	t
Yellow-headed blackbird *(Xanthocephalus xanthocephalus)*	t
Red-winged blackbird *(Agelaius phoeniceus)*	b
Orchard oriole *(Icterus spurius)*	t
Northern oriole *(Icterus galbula)*	b
Rusty blackbird *(Euphagus carolinus)*	t
Common grackly *(Quiscalus quiscula)*	b
Brown-headed cowbird *(Molothrus ater)*	b

Family Sturnidae

Starling *(Sturnus vulgaris)*	b

Family Ploceidae

House sparrow *(Passer domesticus)*	b

Family Thraupidae

Scarlet tanager *(Piranga olivacea)*	b

Family Fringillidae

Common cardinal *(Cardinalis cardinalis)*	b
Rose-breasted grosbeak *(Pheucticus ludovicianus)*	b
Indigo bunting *(Passerina cyanea)*	b
Dickcissel *(Spiza americana)*	t
Evening grosbeak *(Coccothraustes vespertinus)*	t
Purple finch *(Carpodacus purpureus)*	b
Pine grosbeak *(Pinicola enucleator)*	t
Common redpoll *(Acanthis flammea)*	t

American goldfinch *(Spinus tristis)*	b
Pine siskin *(Spinus pinus)*	t
Red crossbill *(Loxia curvirostra)*	t
White-winged crossbill *(Loxia leucoptera)*	t
Rufous-sided towhee *(Pipilo erythrophthalmus)*	b
Savannah sparrow *(Ammodramus sandwichensis)*	b
Sharp-tailed sparrow *(Ammodramus caudacutus)*	t
Henslow's sparrow *(Ammodramus henslowii)*	b
Grasshopper sparrow *(Ammodramus savannarum)*	b
Vesper sparrow *(Pooecetes gramineus)*	b
Tree sparrow *(Spizella arborea)*	t
Chipping sparrow *(Spizella passerina)*	b
Clay-colored sparrow *(Spizella pallida)*	t
Field sparrow *(Spizella pusilla)*	b
Dark-eyed junco *(Junco hyemalis)*	t
Harris' sparrow *(Zonotrichia querula)*	t
White-crowned sparrow *(Zonotrichia leucophrys)*	t
White-throated sparrow *(Zonotrichia albicollis)*	b
Fox sparrow *(Passerella iliaca)*	t
Lincoln's sparrow *(Passerella lincolnii)*	t
Swamp sparrow *(Passerella georgiana)*	b
Song sparrow *(Passerella melodia)*	b
Lapland longspur *(Calcarius lapponicus)*	t
Snow bunting *(Plectrophenax nivalis)*	t

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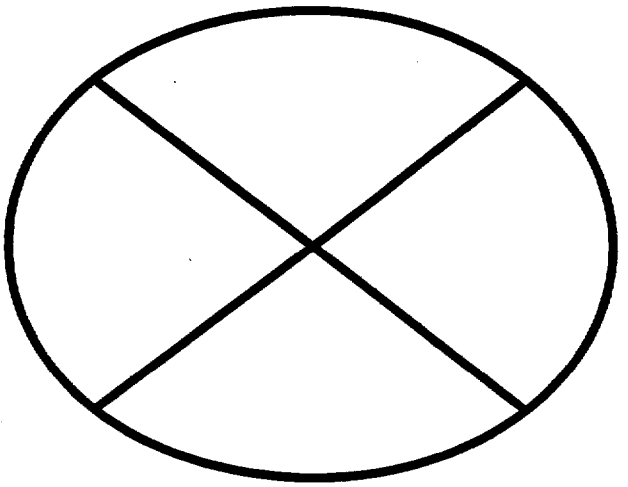

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GOVERNMENTAL PROCESS

CENTRAL NEW YORK COASTAL ZONE MANAGEMENT PROGRAM

PHASE I: TECHNICAL MEMO #7

DECEMBER 1975

INTRODUCTION

Purpose of Study

This report provides a summary of existing regulatory and administrative activities in the Coastal Zone carried out by various governmental agencies. To ensure coordination of the Coastal Zone Management Program with local, regional, state, and federal agencies, and other interested parties, CZM must be developed in a manner which affords participation by those governmental units.

Requisite to such participation is an understanding of the processes which presently affect activities and land and water uses in the Coastal Zone. This report identifies those processes and, to the extent that information is available, assesses their application and influence on land and water uses.

An important component of the Central New York Coastal Zone Management Program is the identification of potential conflicts between existing and possible future land and water uses, and the existence and characteristics of natural features. Analysis of the significance of these resources to the Coastal Zone and their relationship to state, regional, and local objectives will provide the basis for future designation of priorities. In this way, the Coastal Zone Management Program will enable residents to decide how to best utilize the natural resources and what uses should be permitted or prohibited.

Scope of Study and Study Area

The inventory and analysis covers all political subdivisions which could possibly be included in the CNY Coastal Zone as now proposed by the RPDB. The eight towns, six villages, and one city include:

Town of Sandy Creek
" " Richland
" " Albion
" " Mexico
" " New Haven
" " Oswego
" " Sterling

Village of Sandy Creek
" " Lacona
" " Pulaski
" " Altmar
" " Mexico
" " Fair Haven

City of Oswego

In addition to a discussion of local ordinances, this memo briefly describes state and federal agency activities. Detailed discussions of state and federal programs, agencies, and activities are not provided here as they have been documented in two reports produced by the Great Lakes Basin Commission: Appendices F 20: Federal Laws, Policies, and Institutional Arrangements and S 20 State Laws, Policies, and Institutional Arrangements. For specific information on these subjects, the reader should obtain copies of those reports.

LOCAL REGULATIONS AND ACTIVITIES

The following land use controls are in effect in the OZM study area.

Municipality	Master Plans	Zoning	Subdivision	Building Codes	Flood Insurance	Mobile Home	Other[4]
Sandy Creek (T)	-	-	-	-	x[3]	x	-
Sandy Creek (V)	-	-	-	-	-	x	-
Lacona (V)	-	-	-	-	P	-	-
Richland (T)	-	x	-	-	x	-	-
Pulaski (V)	x	x	x	x	x	-	x
Albion (T)	-	-	-	-	x	-	-
Altmar (V)	-	-	-	-	-	-	-
Mexico (T)	-	-	-	x	C	-	-
Mexico (V)	-	x	x	x	x	x	-
New Haven (T)	-	-	-	-	P	-	-
Scriba (T)	-	-	-	-	C	-	-
Oswego (C)	x	x	x	x	-	-	x
Oswego (T)	-	-	x	-	S	x	-
Sterling (T)	-	P[1]	x	x	-[2]	-	x
Fair Haven (V)	-	P	-	x	BC	x	x

[1]
[2]P-In process
Flood Insurance or ordinance contained in Building Code, Subdivision Regulations
[3]C-Under consideration
[4]Other -- Other includes junkyards, signs, housing, sewer and septic tank ordinances.

In brief, the municipalities have the following breakdown: 13% have Master Plans. 40% zoning ordinances, 33% subdivision regulation, 40% have building codes. 73% have or are in the process of becoming eligible for flood insurance, 26% have mobile home ordinances and 26% have other types of ordinances.

In terms of controlling land use, only two municipalities have Master Plans, the City of Oswego and the Village of Pulaski. An obvious shortcoming, then, is the lack of planning and the development of master plans.

The regulation of land use through zoning, subdivision regulations, etc. is inadequate. Although the flood insurance program has been relatively successful, this program was initiated at the Federal level, with municipalities providing little local initiative. Municipalities must accept planning and land use regulation as a local responsibility.

Since most of the municipalities do not have master plans, individual land use ordinances are difficult to evaluate, although there are problems with specific ordinances. For example, the model flood ordinance does not prohibit any use of land in a flood prone area, nor does it prohibit development within an area smaller than a 100 year flood plain. However, the ordinance which is entitled "Protection of Construction in Areas Susceptible to Flood" does place restrictions on development, and in that sense, the ordinance is effective.

The subdivision regulations for the Town of Oswego considers only parcels two acres or less in size as a subdivision. Any subdivision larger than two acres is not considered a subdivision for purposes of this ordinance. This feature of the ordinance is not uncommon and is a problem in many subdivision regulations. The ordinance regulates the use of plats rather than regulating the subdivision of land.

It would seem preferable to require that all subdivisions of land be platted and approved, and classify certain types as minor subdivisions subject to much less stringent substantive requirements and more expeditious procedural requirements. Simply stated, all subdivisions of land must be platted and approved.

Another problem is the fragmentation of land use controls. Most ordinances are established during a short-range and immediate problem or crisis situation. Over the years, each ordinance which is developed is not coordinated with existing ordinances nor are ordinances revised over set periods of time, leaving many of them outdated, obsolete or useless. It is becoming more common for the provisions of many of these separate ordinances to be combined into a single comprehensive ordinance usually called a land development control ordinance. This is an interesting concept which would have numerous benefits for any municipality. One must assume, however, that such an ordinance would be developed based on a master plan.

The Town of Sterling has subdivision regulations, a mobile home ordinance, and a junk yard ordinance. Since the Town adopted its subdivision regulations in 1968, there have been no subdivision plans submitted to the Town Planning Board for review. The Town Board has yet to approve a Town Land Use Ordinance written for them by the County Planning Board staff.

At this writing, the Town has not qualified for participation in the National Flood Insurance Program. As a result, federal agencies and federally supervised, insured, or regulated lending institutions are prohibited from making loans for development in the areas of the Town designated as Flood Hazard areas.

The Town Mobile Home Ordinance requires a permit and payment of a fee for mobile home parks of 2 or more trailers. All mobile homes in the Town must comply with the ordinance (i.e. lot size, trailer size and floor area, etc.). The ordinance is enforced by the Town Trailer Inspector, who reports to the Town Board.

Sterling's automobile junk yard ordinance establishes a minimum set back of 50 feet, with fencing, from a public highway. It also defines the location requirements and aesthetic considerations for such junk yards. The Town Board is responsible for administering and enforcing this ordinance. There are currently two licensed junk yards in the Town.

The Village of Fair Haven has a flood ordinance in process (resolution passed), a mobile home ordinance, a junk car ordinance, and utilizes the State Building and Construction Code.

The Village Resolution for HUD Flood Insurance is the first step toward qualifying for national flood insurance. The Village Board, when reviewing applications for building permits, including the plans and specifications for the proposed construction, will review all building permit applications to determine if the proposed construction is consistent with the need to minimize flood damage.

The village mobile home ordinance requires a permit and fee for every mobile home within the village. There are currently four small mobile home parks with approximately 8 to 12 units in each park. Fair Haven village is predominantly a retirement community and has many single mobile homes on individual lots as retirement homes. The Village Board is the administering agency for this ordinance.

The village junkyard ordinance prohibits "the use of any land, lot, structure or part thereof as a "junkyard". The Village Board is currently getting the last junkyard operator to clean and remove cars from his property.

The town has no zoning ordinance, but on December 2, 1975 members were selected for a Zoning Board who will be charged with writing a zoning ordinance for the village.

STATE AND FEDERAL ACTIVITIES

Federal Insurance Administration, U.S. Department of Housing and Urban Development: The Federal Insurance Administration (FIA) is the agency within HUD which is responsible for coordinating and administering activities of the National Flood Insurance Program. The FIA identifies and maps flood hazard areas, and forwards this information to affected communities.

Geological Survey, U.S. Department of the Interior (USGS): The USGS is the agency responsible for collecting information about stream and lake discharge and stage characteristics. Data is published annually on thousands of lakes and stream reaches, which can be used in surface drainage planning for the CNY coastal zone.

Soil Conservation Service, U.S. Department of Agriculture: The Soil Conservation Service (SCS) is responsible for administering, among other land and water resource programs, Small Watershed Protection and Flood Prevention Projects ("PL 566"). Numerous measures for controlling flooding and erosion may be employed, including dams, levees, channel improvements, land treatment, and so on.

Corps of Engineers, U.S. Department of Defense: The U.S. Army Corps of Engineers performs a variety of functions relating to surface drainage planning and implementation. Included are flood plain information reports, engineering studies, and structural improvements such as dams, levees, and channel and stream clearance work.

Great Lakes Basin Commission: The Great Lakes Basin Commission was created by Presidential order in 1967 under authorization of Title II of the Water Resources Planning Act of 1965. This Commission is composed of a presidentially appointed full-time chairman, and one representative from each of nine Federal agencies concerned with water resources, each of the eight Great Lakes states, and the Great Lakes Commission. The objectives of the Basin Commission are to prepare a joint coordinated plan for the development of the basin's water and related land resources, taking into consideration the diverse needs of the basin and preserving opportunities for the future; recommend long-range priorities for implementation of the plan; and coordinate water and related land resources planning efforts at all levels of government in the basin.

NYS Department of Environmental Conservation: The Department of Environmental Conservation (DEC) was created in 1970 to consolidate under one department various existing State programs involving the quality of the environment, water resources planning, development, and management, and programs relating to air, land, and water pollution.

Duties of DEC include the following: the planning, development and management of the State's water resources; undertaking studies on a regional basis, preferably with local participation, for the protection, conservation, development and use of water resources within any region of the State; the apportionment of water for public water supply systems; the investigation of the purity of public water supply systems and of the works constructed;

the classification of the waters of the State and the establishment of standards of quality and purity; pollution abatement and water quality management; the drainage of agricultural lands, primarily through districts set up for this purpose; river regulation and river improvement, through districts set up for this purpose; river regulation and river improvement. through districts set up for these purposes; flood control and flood plain management; the planning of public water supply systems for intermunicipal areas; the protection of stream beds from disturbance, the control of dredging and fill in navigable waters, and the control of the construction of dams and docks. The Department also acts as the agent for the State of New York in partnership ventures with Federal and local entities and represents the State's interest in interstate water resources planning and development activities. DEC is a major contractor in State CZM planning.

St. Lawrence-Eastern Ontario Commission: The St. Lawrence-Eastern Ontario Commission was established by law in 1969 to encourage development of the Area while preserving its valuable yet vulnerable resources.

The Commission has thirteen members appointed by the Governor for overlapping four-year terms. Jefferson and St. Lawrence Counties are each represented by four commissioners; there are also two from Oswego County, and two appointed from outside the Area. One commissioner from each county must be a member of that county's planning board.

The service area of the Commission includes the twenty-three towns along the Lake and River in Jefferson, St. Lawrence, Oswego, and Cayuga Counties, plus the cities of Ogdensburg and Oswego.

The Commission's objectives are to preserve, enhance, and develop the scenic, historic, recreational, and natural resources, and to design programs that will encourage the full development of commercial, industrial, agricultural. and residential resources of the St. Lawrence River Valley and the lands adjacent to Eastern Lake Ontario.

CONCLUSION

The absence of comprehensive policies to guide land use, and ineffective enforcement of existing controls has allowed some degree of haphazard development to occur in the CNY coastal zone. As this area and its resources are placed under steadily increasing pressure to satisfy residents' and vistors' demands for recreation, homes, and industry, adherence to stricter development guidelines will be necessary.

Recommendations

1. Enforcement of local land use controls should be monitored through CNY CZM Program.

2. Development of stronger comprehensive planning activities, in concert with land use regulation, should be encouraged at the local level and coordinated through the CZM Program.

3. Establish committee advisory to CZM program comprised of local government officials.

4. The State DSP, as part of CZM program, should establish formal mechanism to coordinate activities of contractors and other agencies performing tasks related to the coastal zone; a regular schedule of coordination meetings should be established.

LAND USE / WATER USE

CENTRAL NEW YORK COASTAL ZONE MANAGEMENT PROGRAM

PHASE I: TECHNICAL MEMO #8

DECEMBER 1975

INTRODUCTION

This memo provides an inventory of existing land and water uses in the CNY coastal zone, including those covered by traditional land use categories in general, with other information on recreation facilities, power, historic sites, coastal access, physical features, economic development, shipping, and population. Some of the information contained herein lends itself to graphic presentation; this includes the land use inventory depicted on the map at the end of the report. Other information describing various land and water uses, and more significantly, activities, is discussed in the narrative.

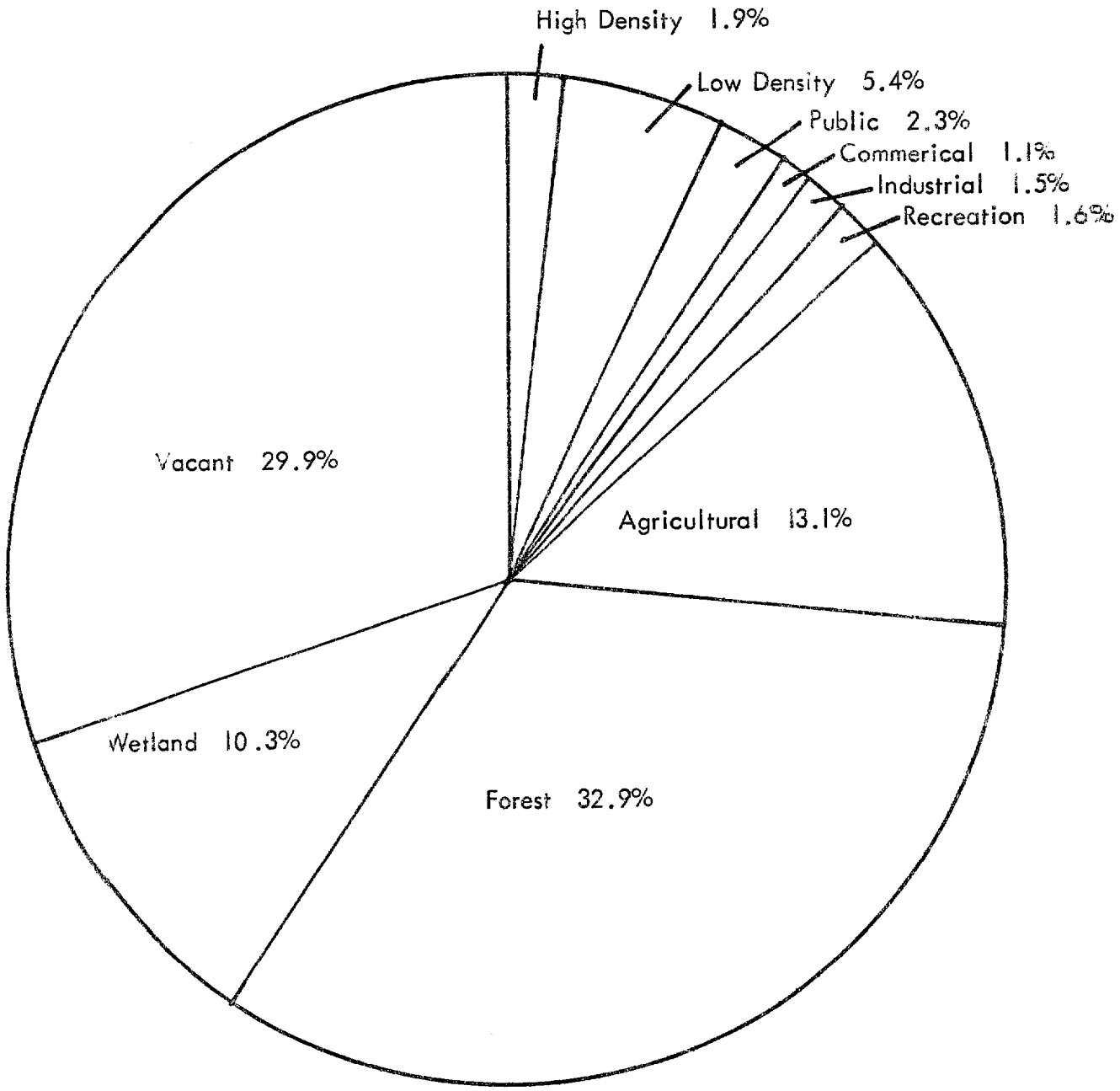
Purpose of Study

In order to better plan for future coastal land uses and activities, it is necessary to understand the processes that shape current coastal activities. Information on land and water use characteristics complements the data available on natural resources phenomena. Through an analysis which provides descriptions of the relationships between cultural and economic phenomena -- i.e., land and water uses and man's activities -- and natural phenomena, we are able to identify and measure the consequences of such activities on the environment. Such data enables coastal residents to make informed choices about future land and water activities. The study also serves as the basis for identification of potential development areas.

Scope of Study and Study Area

Land use information has been collected from LUNR sources and updated with aerial photography. The small scale map at the end of this memo is a summary depiction of current land use in CNY coastal areas. Information is presented to the greatest inland extent of the RPDB's proposed coastal zone boundary options (Technical Memo #2: Boundary, option #3). The textual information contained herein describes population data and coastal activity information on shipping, recreation, power generation, and other coastal phenomena. Information derived from Technical Memos #3, #4, #5, #6, #7, and #9 is utilized to help determine where potential development should occur.

The total land area of the coastal zone is approximately 75,714 acres, including 1,471 acres of urban high density use, 4,066 acres of low density urban use, 1,735 acres of public use, 798 acres of commercial, 1,116 acres of industrial, 1,236 acres of recreational use, 9,881 acres of agricultural land, 24,926 acres of forest, 7,824 acres of wetland, and 22,661 acres of vacant land. The coastline is 358.5 miles long. 89.6 miles of the coast is developed. (See Figure 1)



Land Use In the Coastal Zone - Figure I

POPULATION AND COASTAL ACTIVITIES

Coastal Zone Population and Projections

The coastal zone contains the portions of the following towns in the county of Oswego: Sandy Creek, Richland, Albion, Mexico, New Haven, Scriba, and Oswego. Cayuga County has only one town in the coastal zone, Sterling. Coastal zone towns have a population of 49,074 persons.*

The following table illustrates 1975 population and projections for towns in the coastal zone:

COASTAL ZONE POPULATION

AND

PROJECTIONS

	1970	1980	1990	2000
Oswego Co.	46,485	53,843	62,387	70,803
Sandy Creek	2,644	2,897	3,387	3,793
Richland	5,324	6,519	7,904	9,483
Albion	1,452	1,931	2,540	3,477
Mexico	4,174	5,191	6,493	7,903
New Haven	1,845	2,293	2,823	3,319
Oswego	3,583	4,467	5,363	6,164
Oswego City	23,844	25,958	28,231	30,031
Scriba	3,619	4,587	5,646	6,633
Cayuga Co.	2,589	2,757	2,967	3,072
Sterling	2,589	2,757	2,967	3,072

OPS Run #5 23 Jan. 1975

All towns in the coastal zone show substantial growth in all time periods projected. The town of Mexico has the highest growth rate over the projected period, showing almost a doubling of population. Care must be taken to ensure the projected growth to take place in an orderly way so that both economic and environmental considerations are taken into account.

Developed Areas

In the early history of the coastal zone, trees were cleared and the soil put to crops. The proximity to Lake Ontario provided the Central New York Region with an outlet to the Great Lakes for military and trade purposes. A large share of the wilderness is now gone, and the coastal zone is being subjected to siting for power plants, mining, residential uses, and other intense development.

*All data based on 1975 OPS data and projections.

Government has facilitated much of this land development by locating and designing airports and highways, insuring home loans, permitting the filling of wetlands, and providing utilities. Local governments exercise primary authority over land use, but often do not take into consideration environmental concerns in their desire for economic gain.

One of the greatest pressures on urban areas is the need for housing. Presently approximately 5% of the coastal zone is used for housing. The shore has been used extensively for second home development. The shore is often bulkheaded, requiring large amounts of fill usually obtained by dredging, which upsets the natural ecological system. Through the action of high winds and water, landowners incur extensive property damage which is occasionally accompanied by loss of life.

Shore erosion poses a critical problem to those living along the water's edge. Development without attention to normal sand movement patterns, migration of beaches, and erosion has already brought pressures on the Corps of Engineers and other agencies to interfere with natural processes that have continued for eons.

The patterns of human migration and settlement are not well understood in the coastal zone. More study must be done to determine the factors which will affect the development of a comprehensive management scheme.

Industry

In general, industries concentrate in the coastal zone because of transportation advantages, import and export requirements, and the need for large quantities of water.

The industrial area in the coastal zone is about 1116 acres. Though the total area which industry occoupies in the coastal zone is not very great, its impact on the coastal system can be severe. Waste disposal, oil spills, and the escape of toxic materials into aquatic ecosystems are all unfortunate by-products of industry which affect the coastal environment.

In general, the coastal zone is an attractive location for five major types of industry:

1. Industries that benefit from location near low-cost water transportation and inland transportation systems.

2. Industries that derive power from water or use water for process or cooling purposes.

3. Industries that are beneficially located near centers of population but do not have direct dependence on, or need for, water or water access.

4. Marine transportation industries.

5. Industries that depend directly on the marine environment for raw material for commercial activity.

Each type of industry is unique in the conditions and resources it demands from the coastal zone. Each is also unique in the constraints that the environment and other coastline uses impose on it.

In view of the probable expansion of industry with its associated influx of people and housing developments, it is essential that the coastal states in conjunction with the federal government formulate an adequate coastal plan.

Commercial Shipping Facilities

The Oswego harbor is the only commercial shipping facility in the coastal zone. It is located about 15 miles from the eastern end of Lake Ontario, about 45 miles south of the entrance to the St. Lawrence River. As the eastern-most port on Lake Ontario, the Oswego harbor is one of the first and last ports of call in a normal itinerary for vessels entering and leaving the Great Lakes.

The Port of Oswego is the Lake Ontario terminus of the New York State Barge Canal System which provides a controlling depth of 12 feet to inland ports such as Buffalo, Rochester, Syracuse, Ithaca, and Watkins Glen. It is also the Great Lakes terminus of the Great Lakes-Hudson River Waterway which provides a controlling depth of 12 feet to Utica, Schenectady, Albany, and the New York City Harbor.

Harbor Facilities

There are two Barge Canal terminals in general use in the Oswego Harbor. The lake terminal is situated on the pier, now owned by the New York State Port of Oswego Authority. The pier contains a grain elevator with a capacity of 1,038,000 bushels and a general cargo area with about 28,000 square feet of covered storage area. The grain elevator has an input capacity from ship to elevator of 20,000 bushels per hour using two marine legs. The facility has a capacity for ship or barge loading of 32,000 bushels per hour using three spouts. One spout is available for loading rail cars at a rate of 20,000 bushels per hour; equipment for car unloading consists of two pits and two power shovels for each pit. All facilities on this pier are served by the Erie-Lackawanna railroad. Available water depth at the pier ranges from 19 to 21 feet.

The river terminal of the Barge Canal is located upstream of the federal project. It is a modern wharf used for the receipt and shipment of canal bulk freight. No warehouse facilities are available and any handling equipment required is of a portable type furnished by the stevedoring contractors. Wharfside water depth is 14 feet.

Inner harbor terminals are maintained by the Oswego Harbor Marina, the Port of Oswego Authority, Montcalm Dock Company, National Gypsum Company, and the Metropolitan Petroleum Company. The Oswego Harbor Marina is located in the slip on the east bank, upstream of the federal project. Water depths in the slip vary from 15 feet at the river end to 9 feet at the inner end. The remainder of the east bank to the harbor entrance has been acquired by the Port of Oswego Authority and developed with a 1,200 feet long marginal wharf used for handling aluminum and general cargo. Water depth is 24 feet.

The Montcalm Dock Company has a wharf on the coast bank of the Oswego River used for receipt and shipment of coal and to a limited extent for ship bunker-

ing. Upstream of this facility the Metropolitan Petroleum Company has an oil terminal with a storage capacity of 12 million gallons. The National Gypsum Company operates the facilities for handling cement at a wharf immediately upstream of the oil terminal. Pneumatic equipment for the transfer of bulk cement to storage bins is available. Water depth is 21 feet at the oil and cement terminals. The frontage upstream of the cement terminal is used for occasional receipts of sand and gravel and for the unloading of fish.

Outer harbor terminals include a former Erie-Lackawanna coal dock currently used as a storage area by the Port of Oswego Authority. West of this area is the New York State Naval Militia Pier. This pier and the area to the east are used for the mooring of recreational craft. The City of Oswego is planning a large expansion of small boat facilities in this area. West of the naval pier, extending for 1,300 feet, is a city park that was built on fill placed behind a stone dike. The Niagara-Mohawk Power Corporation wharf is located at the extreme west end of the outer harbor with facilities for receiving fuel for the oil fired thermal generating units located immediately inland.

Shipping Season

As part of the Great Lakes-St. Lawrence Seaway commercial navigation system, the flow of waterborne commerce is influenced by ice formation caused by winter weather conditions. The earliest opening of the navigation season has been in late March; the latest in late April. The earliest closing of the navigation season has been in late November; and the latest in mid-December. For all practical purposes, Oswego Harbor is navigable throughout the entire year for intra-Lake Ontario traffic as far east as Ogdensburg-Prescott. Access west to Lake Erie is controlled by the open dates of the Welland Canal. Access east to the lower St. Lawrence River (downstream from Ogdensburg) is controlled by the open dates of the St. Lawrence Seaway.

Harbor Commerce

The area tributary to Oswego Harbor is that part of New York State generally east of Rochester and west of the area served by Ogdensburg. Major cities within this tributary area are Rome, Utica, Syracuse, Auburn, and Fulton. Industries within the area produce paper products, metal castings, air conditioning, refrigeration and heating equipment, furniture, wire rope, plywood products, chemicals, and fertilizers. An aluminum rolling mill, added in 1962, is in the immediate Oswego area.

The port of Oswego has had a substantial increase in total commercial traffic over the past ten years. Waterborne commerce, shown in Table 1, is divided into foreign and domestic traffic and subdivided into imports and exports. Overseas commerce has not changed substantially over this period of time. The increase of commerce through Oswego is accounted for almost entirely by imports from Canada, while exports to Canada had no appreciable effect. In 1973, 83% of all freight traffic consisted of Canadian imports. Basic chemicals were the only substantial export commodity.

In 1973 residual fuel oil, a Canadian import, accounted for 70 percent of all freight traffic. Other principal items of commerce were building cement, fertilizers, chemicals, grain, and aluminum. Table #2 indicates waterborne traffic in Oswego Harbor by commodity over the past ten years.

TABLE 1

OSWEGO HARBOR TRAFFIC*

Year	Total Tonnage	Foreign				Domestic			Harbor Vessels	
		Overseas		Canadian		Lakewise	Internal			
		Inbound	Outbound	Inbound	Outbound	Receipts	Receipts	Local	Inbound	Outbound
1973	930,877	7,303	1,329	774,576	32,451	115,176	---	42	355	355
1972	779,417	20,182	101	576,624	21,301	158,885	12,272	52	384	381
1971	491,196	10,526	1,753	268,523	1,293	208,391	---	60	338	336
1970	473,553	10,036	436	277,595	3,866	181,586	---	34	365	367
1969	424,312	3,739	---	269,443	7,398	139.889	---	58	402	397
1968	380,033	8,045	858	142,995	27,271	170,985	29,879	--	220	211
1967	342,218	5,106	3,251	112,630	5,555	177,953	37,618	75	355	351
1966	449,154	403	852	115,229	17,404	220,389	25,087	--	714	708
1965	252,566	10,148	2,911	39,402	11,463	157,573	31,021	48	187	184

* All units short tons except for number of harbor vessels

TABLE 2

Oswego Harbor -- Waterborne Commerce by Major Commodity (Short Tons)

Calendar Year	Residual Fuel Oil	Building Cement	Basic Chemicals & Products	Grains	Fertilizers	Other Commodities	TOTAL
1973	650,928	177,246	39,179	23,678	20,993	18,853	930,877
1972	456,834	187,765	10,367	33,991	19,141	71,319	779,417
1971	147,953	248,638	-	41,159	-	51,446	491,196
1970	150,599	231,824	-	34,328	-	56,802	473,553
1969	150,236	211,164	7,398	31,827	-	23,687	424,312
1968	73,345	183,932	25,040	31,049	37,591	29,076	380,033
1967	87,126	174,782	5,555	37,516	13,141	24,098	342,218
1966	48,135	166,612	11,753	159,031	24,874	38,749	449,154
1965	29,141	118,325	11,463	31,209	11,807	50,621	252,566
1964	40,040	98,723	25,555	35,087	-	46,953	246,358

Maintenance and Expansion

As a federal harbor, maintenance and construction of breakwaters and dredging are performed through the U.S. Army Corps of Engineers. They are also responsible for maintenance of authorized channel depth.

The principle source of harbor sediments at Oswego is the natural west-to-east littoral drift along the Lake Ontario shoreline. Limited amounts of sediment materials are contributed by surface water runoff and bank and shoreline erosion within the harbor, and dissolved material from agricultural and industrial activities. More than a million cubic yards of silt and silty sand have been removed from the harbor during the years 1965-1975. 130,186 cubic yards were dredged during FY 1975.

The Environmental Protection Agency has determined that sediments dredged from the Oswego Harbor channels are polluted and unacceptable for open-lake disposal. Consequently, dredged material will be placed in diked disposal areas as soon as such a facility is constructed. Region III, U.S. EPA has approved open lake dumping of dredged materials until the confined disposal area is completed. Preliminary designs for the confined dumping site show it to be a semi-circular facility capable of holding about 850,000 cubic yards of material. Tentative completion of the project is scheduled for 1979.

Other than changes in recreational boating facilities, no commercial changes in harbor use are currently anticipated. However, were the Great Lakes-St. Lawrence Seaway system increased from the current 25'9" depth to a 31' depth, an estimated expenditure of $33,000,000 would be necessary at Oswego Harbor for dredging to that depth.

Power Generation

The coastal zone lies in the upstate New York power system, Federal Power Commission Power Supply Area 4. All service to the coastal zone is provided by the Niagara-Mohawk Power Corporation, a private electric and gas utility company. A total of 17 generating units of various types are located in or near the coastal zone.

Initial generating capacity was developed through run-of-river hydroelectric units. There are five units on the Oswego River which are in or near the coastal zone. These units were all built before 1930 and have an installed capacity of 29.3 mw. They are located between the City of Fulton and the terminus of the Oswego River on Lake Ontario. All of the river's conventional hydroelectric power potential has been developed. There are two hydroelectric units located upstream of the town of Altmar in the Salmon River basin. These units have a combined generating capacity of 30.25 mw.

Two other types of generating units are located in the coastal zone. They include oil fired and nuclear reactor thermal units. Use of fossil fuels for power production began in the late 1930's with the construction of a coal-fired facility in the City of Oswego. This site has since been expanded to hold five generating units with a total capacity of 1,035 mw. and a proposed sixth generating unit with a name-plate capacity of 850 mw. The four older units at this steam station have been changed over form coal to oil fuel, giving the station a primary oil burning capacity.

The coastal zone is located near the cross-state bulk power transmission system. Major load centers are located throughout western, central, and eastern New York State and since transmission costs are minimized by locating generation as nearly as possible to load centers, the coastal zone is a favorable location for power plant sites. Nuclear thermal generating units were first proposed in the area in 1963. Large quantities of readily available water for once-through cooling systems, favorable meteorological characteristics for airborne discharge dispersal, relatively unpopulated countryside, and stable geologic characteristics have attracted several nuclear thermal operations.

The first nuclear generating unit began operation in 1969. It is located on Lake Ontario at Nine Mile Point, about six miles east of the City of Oswego. A second nuclear power plant, located about one mile east of the Nine Mile Point facility, began operation in 1975. Nine Mile Point Unit #2 is in the design stage and is scheduled to begin operation in 1981.

West of the City of Oswego, in the town of Sterling, Cayuga County, a site has been chosen for a proposed nuclear thermal generating plant. Location characteristics are similar to those of the Nine Mile Point sites. This unit is scheduled to begin operation in 1982.

Current generating capacity of power plants in and near the coastal zone is 2,715 mw. An additional 3,100 mw. will be provided by units either proposed or under construction. By 1982, the area will have a total generating capacity of 5,815 mw. based on current and expected power production. Upstate New York annual peak power needs through the year 2000 are projected at 5,008 mw., and the year 2020, 11,897 mw. The Nine Mile Point and Sterling sites have a projected total generating capacity of 5,000 mw. each, although no development beyond that mentioned above is proposed. Table 3 summarizes the major power generation facilities in or near the CNY coastal zone.

TABLE 3A

Power Plants in the Coastal Zone

Name	Operator	Status	Location	Type	Capacity (mw	Year
Sterling Power Project	Central Hudson Orange & Rockland Rochester Gas & Electric	Proposed	On Lake Ontario, Town of Sterling	N	1150	1982
Oswego Steam Units 1-4	NMPC	Operating	City of Oswego	F-O	375	1939
Oswego Steam Unit 5	NMPC	Operating	City of Oswego	F-O	85[illegible]	1975
Oswego Steam Unit 6	NMPC	Proposed	City of Oswego	F-O	850	1978
Nine Mile Point Unit #1	NMPC	Operating	On Lake Ontario East of Oswego	N	61[illegible]	1969
Nine Mile Point Unit #2	NMPC	Proposed	On Lake Ontario East of Oswego	N	1100	1981
J.A. Fitz-Patrick Nuclear Power Plant	PASNY	Operating	East of Nine Mile Point	N	821	1975

NMPC = Niagara Mohawk Power Corporation
PASNY = Power Authority of the State of New York

N = nuclear power plant
F-O = fossil fuel-oil

TABLE 3B

Power Plants near the Coastal Zone

Name	Operator	Location	Type	Capacity (mw)
Varick	NMPC	Oswego River	H	8.8
High Dam	NMPC	Oswego River	H	7.6
Minetto	NMPC	Oswego River	H	8.0
Granby 1 & 2	NMPC	Oswego River	H	3.7
Fulton	NMPC	Oswego River	H	1.3
Lighthouse Hill	NMPC	Salmon River	H	3.75
Bennet Bridge	NMPC	Salmon River	H	26.5

NMPC = Niagara Mohawk Power Corporation

H = hydroelectric unit

Coastal Wetlands

Wetlands in the coastal zone make up 10.3% of the area. Coastal wetlands are discussed in Technical Memo #3, which indicates that constraints should be placed on certain uses to guard against excessive crowding, timber cutting, grazing, motorized transportation, predator control, and infringement. The New York State Freshwater Wetlands Act of 1975 offers a method to insure proper wetlands usage by requiring environmental impact analysis of proposed development projects which may disturb wetland ecology.

Recreation

Recreation is one of the largest and fastest-growing uses of the coastal zone. This broad category encompasses a variety of activities, ranging from the most vigorous -- swimming, water skiing, sailing, and diving -- to the most contemplative -- painting, wildlife observation, sunbathing, or just admiring the view. Only 1.6% of the coastal zone is used specifically for recreation. A projected salmon fishing program, expansion of State Park Facilities, and new port/refuge facilities will expand tourism and recreation in the coastal zone.

Coastal tourism and recreation is unevenly distributed. The degree to which land is used depends upon the planning, development, and management of coastal parks, preserves, and historic sites, and the influence of three major enhancement factors: (1) markets, (2) infrastructure, and (3) transportation and access.

The potential of an area is dependent upon both its range of resource characteristics and the range of activities desired by the public.

Physical entities which provide for people's leisure-time activities have the following characteristics: (1) they are frequently anchored to specific geographic settings due to dependency upon certain natural or cultural resources; (2) they have great economic impact upon local communities and are successful if they satisfy nearly all the people who have interests in the activities supported; (3) they are productive only if they are accessible; therefore transportation and access are important; (4) the fact that an existing service area (a city or other collection of services) is within easy reach; (5) developed attraction destinations are already attracting visitors and have established reputations as destinations; and (6) they are dependent upon the quality and functional success of the design, construction, and management of the unit.

If the coastal zone can be tested for its potential development of recreational land use, an evaluation of its overall tourism potential will result.

The coastal zone has a number of attributes which makes the area attractive for recreational purposes. The presence of Lake Ontario and the rural nature of the countryside are conducive to several types of outdoor recreation. The natural features of the area are enhanced by the existence of two state parks, boating facilities, and numerous private commercial areas.

The following is intended as a review of the recreational resources in the coastal zone. The resources are divided into State parks, boating and fishing facilities, transient accomodations, open space areas, and miscellaneous activities.

TABLE 4

STATE PARKS -- COASTAL ZONE

Park	Location	Size (acres)	Facilities	Activities	Visitors
Fair Haven Beach	Cayuga Co. On Lake Ontario	861	Boat Launching facilities Picnic tables Beach	Camping Picnicking Swimming Boating Fishing	312, 549
Selkirk Shores	Oswego Co. On Lake Ontario, west of Village of Pulaski	980	Cabins Camping sites Rest room facilities General Store Beach Playfields Golf course	Camping Picnicking Swimming Fishing Sports Hiking	199, 639
Fort Ontario Historical Site	Oswego Co. City of Oswego	36	Playgrounds & fields Historic site Track	Reconstructed fort Baseball Swimming Sports	Unknown

State Parks

Two state parks are located in the coastal zone. Fair Haven Beach State Park is in the Village of Fair Haven in Cayuga County. Selkirk Shores State Park is in the town of Pulaski in Oswego County. These parks offer a number of facilities oriented around water sports and camping. Together these parks attracted about 510,000 visitors in 1970, an increase in approximately 20% over 1960 attendance. The parks attract 80% of their visitors from within a 50 mile radius which includes such metropolitan areas as Syracuse and, for Fair Haven Beach, the City of Rochester.

A second type of state-maintained attraction is the Fort Ontario Historic site located in the City of Oswego. In conjunction with the city, the site offers an educational experience in the form of a reconstructed fort as well as facilities for outdoor sports activities (See Table 4).

Boating and Fishing Facilities

There are five main harbors in the coastal zone area. These are located along the length of the coastal zone shoreline from Little Sodus Bay in Cayuga County to North Sandy Pond in northern Oswego County. Scale of harbor development ranges from a federal deep-water harbor at Oswego to the natural bay at North Sandy Pond. The five harbors contain a total of 370 pier moorings.

Two of the harbors, Oswego and Little Sodus Bay, are classified as harbors of refuge. These harbors provide not only protection from storms but are also designed primarily to enhance recreational boating. The U.S. Army Corps of Engineers recommends that harbors of refuge exist at 30 mile intervals along shorelines. Using this spatial distribution criterion, plus the projected use demands due to the salmonid program, establishment of harbors of refuge at Mexico Point, Port Ontario, and North Pond have been recommended by the St. Lawrence-Eastern Ontario Commission. These recommendations generally consist of upgrading existing protective devices and increasing launching and mooring facilities.

Public boating facilities in the Coastal Zone consist, for the most part, of moorings and launch ramps. Three state-owned ramps are scattered through the area with the most extensive development at the Mexico Point State Marina. This facility has two launch ramps and six pier moorings. The City of Oswego operates a municipal launch ramp with four pier moorings.

Private commercial boat facilities are located throughout the Coastal Zone, although they are concentrated around Fair Haven, the Salmon River terminus, and North Pond. There are 14 launching ramps and 391 pier moorings privately operated in the Coastal Zone.

The impact of the salmonid fisheries program has been analyzed by the St. Lawrence-Eastern Ontario Commission. Use of fishing resources will increase as the salmon become established and attract fishermen. The gap between supply and demand for pier moorings is projected to be in the range of 1500-2000. About 5,400 boats are expected to be active in the Coastal Zone area under design day criteria. Approximately 10 minutes are required to launch or retrieve a boat, requiring the addition of 30 simultaneous launch facilities.

Public access areas for fishing purposes are currently limited to a 3.7 mile length of the Salmon River. This section is located between Pulaski and Altmar and has one access point. The Salmonid Fisheries Program Report (SLEOC) proposes that public access rights and parking areas be acquired along the Little Salmon River, Rice Creek, Sterling Creek, and Sterling Valley Creek. Table 5 indicates various surface waters and fish found in them; Table 6 indicates harbor and boat launching facilities.

TABLE 5

Surface waters which are stocked for fishing purposes include:

Grindstone Creek	Brook trout Salmon
Rice Creek	Brown trout
Salmon River	Brown trout Salmon
Sandy Pond-South	Pike, perch
Sterling Creek	Brook trout
Lake Ontario	Coho & Chinook Salmon Brown trout Lake trout Steelhead trout

(The following were particularly productive fishing areas in the coastal zone for fall of 1974 and spring of 1975:)

Location	Species
Lake Ontario-Mexico Bay	Coho Salmon Chinook Salmon Rainbow trout Brown trout
Lake Ontario-Nine Mile Point	Coho Salmon Chinook Salmon Rainbow trout Brown trout
Sodus Bay	Coho Salmon Chinook Salmon Rainbow trout Brown trout
Salmon River	Coho Salmon Chinook Salmon Rainbow trout
Grindstone Creek	Chinook Salmon
Little Salmon River	Chinook Salmon Coho Salmon Rainbow trout
Sodus Creek	Chinook Salmon

TABLE 6

Harbors:

Little Sodus Bay Harbor 70 moorings	Federal medium-draft harbor, old commercial harbor, now used for recreational boating
Oswego Harbor 60 moorings	Federal deep-draft harbor, privately commercial, terminus of NYS Barge Canal System
Little Salmon River 0 moorings	Natural channel. State boat launching site
Port Ontario Harbor 50 moorings	Natural channel - Federal small boat harbor authorized but not built - for recreational boating
North Sandy Pond 190 moorings	Natural bay, private development

Public Boat Facilities:

Operator	Location	Facilities
State	Fair Haven Beach State Park	2 Launch Ramps
Municipal	Oswego River at Lake Ontario	1 launch ramp 4 pier moorings
State	Mouth of Little Salmon River	2 launch ramps
State	Mexico Point State Marina	2 launch ramps 6 pier moorings

Commercial Boat Facilities:

Name	Location	Facilities*
Buster's Boat Basin	Little Sodus Bay	Gas and oil Engine & hull repairs launch ramp
Fair Haven Beach Launch	Little Sodus Bay	Launch ramp
Fair Haven Beach Yacht Club	Little Sodus Bay	Launch ramp
Rasbick's Marina	Little Sodus Bay	Gas and oil Engine & hull repairs Launch ramp

Oswego Marina	Oswego/Lake Ontario	Gas and oil Pumping station 44 pier moorings
Lock 7 Marina	Oswego Canal	Gas and oil Engine repair
Dowie Dale Beach	East of Catfish Creek	Gas and oil 30 pier moorings Launch ramp
Light House Hotel	Mouth of Salmon River	Gas and oil Launch ramp
John's Boat and Bait	Mouth of Salmon River	Gas and oil Engine repair
Kenny's Boat Livery	Mouth of Salmon River	Gas and oil Engine repair Launch ramp
Greene Point	Little Sandy Creek	Gas and oil Engine and Hull repair Launch ramp
Babels Sandy Pond	Little Sandy Creek	Gas and oil Engine & Hull repair Launch ramp
Bartlett's Bait Shop	North Pond/Lake Ontario	Gas and oil Launch ramp
Jone's Marina	North Pond/Lake Ontario	Gas and oil Launch ramp
Sandy Pond Beach	North Pond/Lake Ontario	Unknown
3 Unknown	North Pond/Lake Ontario	Unknown

* 171 pier moorings are distributed among the commercial facilities on the Salmon River, Little Sandy Creek, and North Pond.

Source: Supportive Facilities Plan for Salmonid Fisheries Program -- SLEOC

Recreation Supply Inventory -- NYS Office of Parks & Recreation

Transient Accomodations

The coastal zone contains 330 public campsites that are located in the two state parks. These are largely tentsites without facilities for trailer hookups. The 16 private commercial areas have a total of 1040 campsites. The range of hookups available varies with each camping area. In the area immediately outside the coastal zone there are an additional 236 campsites. Available campsites in or near the coastal zone, both private and public, total 1605.

There are 476 hotel, motel, and cottage overnight accomodation units in or near the coastal zone area.

Open Space

For the purposes of this inventory, open space is limited to those areas either publicly owned or held by a quasi-public agency, exclusive of state parks. Within these limits, there are two areas in the Coastal Zone which are classified as open space. One is Camp Hollis, a recreation area west of the City of Oswego, which is operated by the City. This facility covers 17 acres. It offers activities directed to the 10-13 year old age group, including swimming, day-camps, and play ground sports. The second open space unit is a county reforestation area located north of Miner Road in the Town of Scriba. This area consists of 18 acres and offers some hunting. It has no developed recreation facilities.

Miscellaneous Activities

There are three public golf courses in the Coastal Zone. The Easy Par Country Club is a 75 acre, 9 hole facility in the City of Oswego. The Lan Mar Golf course, located in the Town of Richland, covers 76 acres and has 18 holes. The Elms Public Golf Course is a 57 acre, 9 hole course located in Sandy Creek.

Winter recreation activity is centered around ice fishing, snowmobiling, and some cross-country skiing. Excellent ice fishing is expected to develop near thermal discharge areas of power plants at Nine Mile Point. There is a small downhill skiing facility operated by SUNY at Oswego but its usefulness to the public is limited by short operating hours and minimal tow capacity.

Specific information concerning snowmobiling activity is not available. However, in that the coastal zone is an area which receives 70" to 150" mean average snowfall per year is expected that snowmobile activity is fairly strong. There is an expected high level of local ownership since immediate availability of snow apparently is the greatest factor influencing snowmobile ownership in New York State. There were 6,187 snowmobiles registered in Oswego County and 2,007 in Cayuga County in 1972. 292 snowmobiles were reported as registered in other counties, but used in Oswego or Cayuga Counties.

Agriculture

A wide variety of soil types and markets are found within the coastal zone. Farmers find it advantageous to follow types of farming best adapted to the source of farm income and the prevailing kinds of crops and livestock. The coastal zone includes about 13% of agricultural use. There is a wide variety of farm types including forestry, dairying, potatoes, truck and fruit crops.

Since enactment of the 1971 New York State Agricultural Markets Law, agricultural districts have been established in many counties. Its objective is to protect viable agricultural land from non-farm influences, which tend to force farmers out of business. The agricultural maps developed by Cornell University identify many viable agricultural areas in the coastal zone. Although presently there are no designated agricultural districts in the coastal zone, The Guidelines for Agricultural Districts in Central New York, 1974, by CNY RPDB indicates potential areas in Cayuga and Oswego Counties.

Many types and kinds of conservation measures can be applied to agricultural land in order to reduce serious soil erosion and runoff. Basically they center on conservation cropping systems that use not only crops in a well-planned sequence, but also employ crop-residue management, the needed fertilizer and lime, and a good water disposal system. Soil and Water Conservation Districts are locally organized and managed units of State government composed of elected or appointed landowners who direct a program of soil and water conservation.

The USDA Agricultural Stabilization and Conservation Service has also made a substantial contribution to soil and water conservation. The Rural Environmental Assistance Program, formerly the Agricultural Conservation Program, provides cost-share assistance to farmers in implementing soil, water, woodland, and wildlife conservation practices. Information and education programs conducted by the Cooperative Extention Service have also aided the soil and water conservation effort.

Forest Land

One third of the entire coastal zone is made up of forest land. The long term trend is toward a declining forest acreage as forest land gives way to highways, power lines, reservoirs, and urban, recreational, and industrial developments. The challenge will be to satisfy the increasing development pressure on the coastal zone, and at the same time preserve a forest resource base. Indications are that the present acreage of forest land is needed now and in the future for watershed protection, timber products, recreation, fish and wildlife habitat, aesthetics, or some combination of these.

Forest Land supplies water, timber, recreation areas, wildlife habitat, and enhances environmental quality. Forest resources multiple-use management programs, both public and private, have the objective of producing these products, uses, and services in a compatible and balanced setting. Management efforts must be intensified to derive the optimum mixture of goods and services from the forest land.

The United States Forest Service cooperates with other agencies in CNY, private landowners, State forestry organizations, and local or private organizations to improve forest management. The objectives of these cooperative forestry programs are: (1) to better protect the State, county, community, and privately owned forests and critical watersheds against fires, insects, and diseases; (2) to encourage better forest practices for conservation and profit; (3) to encourage management of the forest portions of watersheds for the regulation of storm runoff and streamflow, reduction of flood damage and sediment production and for the protection of sources of water for municipal and industrial supply, recreation, power, irrigation, and navigation; (4) to aid in distribution of planting stock for forests, shelter belts, and wood lots; and (5) to stimulate development and proper management of State, county, and community forests.

Development Potential in the Coastal Zone

The pressure of development on the coastal zone takes many forms. Historic, recreational, and wildlife habitat development are all important considerations in the coastal zone. These have been addressed in Technical memo #8. However, it is the development of industrial residential, commercial/institutional, and transportation factors which can affect the coastal zone adversely if not properly controlled.

The following section identifies development goals and potential in the coastal zone, with emphasis upon industrial, commercial, and residential development. Phase II work will include more categories of development potential and be more specific on siting.
The technical memos 3, 4, 5, 6, and 9 establish that natural phenomena are dynamic interacting processes which proffer opportunities and limitations to human use. They can therefore be evaluated -- each area of land or water has an intrinsic suitability for certain single or multiple uses and a rank order within these use categories.

The following propositions are applicable to the coastal zone:

(1) The area is vulnerable and has many aesthetically pleasing areas
(2) Development is inevitable and must be accommodated
(3) Uncontrolled growth is inevitably destructive
(4) Development must conform to regional goals
(5) Observance of conservation principles can avert destruction and ensure enhancement
(6) The area can, if managed properly, absorb all prospective growth.

Development Goals

(1) Natural areas should be prohibited from development save by such land uses as are compatible with the present scene. These would include agriculture, large estates, low-intensity use, institutional open space, parks and recreation, public and private.
(2) Development should be prohibited over aquifers.
(3) 50-year flood plains should be exempted from all development save agriculture, institutional open space and recreation.
(4) Current state health regulations prohibiting development on soils unsuitable for septic tanks should be rigidly enforced. On other soils, density of development using septic tanks should be regulated in relation to soil permeability and with reference to aquifers.
(5) Surface water courses should be retained in their natural condition with enough right-of-way on either side to prevent interference.
(6) All forests, woodlands and free standing trees which are large should be surveyed and subject to conservation.
(7) All slopes of 15% or more should be free from development.
(8) All areas of natural and man-made historic value should remain free from development except as public use areas.
(9) Areas containing valuable wildlife and vegetation should be free from disturbance.
(10) All wetlands must remain undeveloped or disturbed.

Areas suitable for development depend on many variables according to the particular use. Urbanization is best on higher grounds of less than 5% slopes, and good orientation. Areas of low agricultural value but scenic are preferable for settlement.

Ports, harbors, marinas, water-related and water-using industries must be

in riparian land and may occupy floodplains. The aquifer recharge areas may absorb some development in a way that does not seriously diminish percolation or pollute groundwater sources. Steep slopes, when forested, may absorb housing of not more than one house per three acres, while forests or relatively flat land may support a density of development of up to 1 acre clusters.

Even when all of the ecological restraints have been applied, and land capable for development found, this merely shows the implications that the land and its process display for prospective development and its form. A plan can be developed only when there is adequate information on the nature of demand, its locational and resource characteristics, the capacities to realize objectives and, the social goals of communities.

The following section identifies general areas with development potential in the coastal zone. However, specific sites can only be identified through extensive analysis and site specific information. Phase II of the Coastal Zone Program will identify areas in more detail.

Potential Areas for Development

(1) Little Sodus Bay is located in the extreme northwest corner of Cayuga County. The majority of residential areas fall within the village of FairHaven at the southeast corner of the bay. Recreational facilities are concentrated in FairHaven Beach State Park.

Much of the land area surrounding Little Sodus Bay is woodland or bushland. Relatively minor agricultural areas exist in the vicinity of the bay, and several tracts of vacant or non-productive land are observed. These areas could be utilized for further residential development.

Some commercial convenience facilities already exist, and the area around the bay should retain its natural land use setting.

(2) The area surrounding Oswego is slowly leaning away from agriculture toward industrialization. Most of the industrialization is concentrated along or adjacent to the Lake Ontario waterfront and at the mouth of the Oswego River. Sections on the western side of the city are presently vacant and run down, and of these areas could be utilized for industrial expansion.

Approximately one-fourth of all the county retail sales establishments center in the city of Oswego. The city of Oswego experienced a 45 percent increase in sales during 1963-1967, while adding only one new establishment. Many areas exist in the city which could be rehabilitated and expanded for commercial facilities.

Oswego Harbor recorded 930,877 total shipping tonnage traffic in 1973. Maintenance of the harbor for continued viability of the Port is necessary. In addition, expansion of the pleasure boat marinas in the area would enhance recreational boating commercial activity.

Population in the City of Oswego was 23,844 in 1970 and is projected to 32,965 by 2000. Seven percent of the homes in the area were listed in 1970 as substandard and in need of replacement. Areas exist in the city and at the edge suitable for further residential development.

(3) Along route 104 in the Town of New Haven is an intersection with 104B near the village of New Haven. This area shows potential for residential development as the land is not particularly suited to agriculture and would make a pleasant residential setting.

(4) The Village of Mexico experienced a 6% increase in population between 1960 and 1970. Little growth in population is predicted for Mexico; however many persons prefer the residential qualities of the area, and due to its proximity to Rt. 81, find it within commuting distance to Syracuse, Fulton, and Oswego.

Mexico is well situated in Oswego County. It has a central location and is serviced by many major routes.

(5) Altmar has a 62% increase in population from 1960 to 1970. A salmon hatchery is proposed along the Salmon River in the Village of Altmar. Families of fishermen and tourists attracted to the area will have to be accommodated. Areas exist on the west side of the village for development of facilities.

(6) Pulaski experienced a 10% increase in population between 1960 and 1970. The village is served by routes 81, 11, 13, 5, and 41, which gives it excellent accessibility. In addition, it is served by Penn Central Railroad which is a mainline through Watertown and Canada.

Development of the salmonid fishing program and harbor of refuge in the mouth of the Salmon River will foster increased need for supportive facilities due to increased tourist and fishing activities.

Excellent opportunities exist for more residential development on either side of the Salmon River. However, sufficient distance must be maintained from the river to prevent flood damage.

(7) Sandy Creek and Lacona are in a very accessible location as they are served by Routes 81, 11, 22, 15, and 48 and the Penn York Central Railroad. This rail line is a main route to Watertown and Canada. Both villages are in pleasant settings near natural areas, and offer excellent opportunities for residential and commercial development.

CONCLUSION

Man has only recently come to realize the finite limitations of the coastal zone as a place to live, work, play, and as a source of valuable resources. This realization has come along with overcrowding, overdevelopment in some areas, and destruction of valuable resources by his misuse of this unique environment. Much destruction of fisheries, recreation areas, and prime ecological habitats has come about by an exponential growth of human activities in the coastal zone in the absence of any planning at all.

If we are to arrive at an effective management scheme for the coastal zone, we will need to sort out these kinds of interrelationships of uses, and to recognize the constraints they impose upon one another.

Some uses of the coastal zone may be displaceable to other locations. With increasing demands on the finite and inherently linear coastal environment, we must be selective in what we choose to place there.

Resources of the coastal zone include such consumables as minerals and fish and involve such nonextractive uses as swimming, boating, and waste dumping. Some of the significant uses and nearshore activities are listed in Table 7. In considering the range of uses and included activities involving coastal resources, one realizes that the planning function is motivated by limitations of available resources and constraints on utilizations. It is important to discern whether resources are limited by natural supply or accessibility.

TABLE 7

Coastal Zone Uses

Uses	Resources
Agriculture	Rare and Endangered Species
Fishing	Prime Forest Areas
Hunting	Productive Wildlife Habitats
Mining	Shallow Bedrock
Drilling	Severe Stoniness
Collecting	Bluffs
Swimming	Sand Dunes
Bird Watching	Poorly Drained Soils
Boating	Erodable Soils
Picnicking	Mineral Deposits
Research	Excessive Slope
Education	Streams and Rivers
Camping	Flood Plains
Industry	Bays
Institutions	Water Falls
Military	Gorges
Housing	Bluffs
Waste Disposal	Scenic Vistas
Access Roads	Scenic Transportation Corridors
Urban Complex	Historic Sites
Vacation Homes	Shoals
Field Games	Barrier Beaches
Resorts	Swales
Parks	Wetlands

Moreover, in situations of goal conflict where resource availability is critical, an orderly development plan may distinguish between mutually exclusive uses and activities in the coastal zone. Some needs are basic and critical to survival of mankind while others are merely desirable options. All, however, have a place in the CNY coastal economy. The Coastal Zone Management Program is an attempt to identify resource uses and attendant activities, determine the importance of the underlying needs, and assign planning priorities accordingly. However, land use and natural resources information is presently available only in general form. Subsequent coastal zone planning work will concentrate on detailing this.

Recommendations:

1. Acquire detailed land use information at a scale adequate to make site specific analysis and recommendations.

2. Incorporate land use and natural resource data in methodology to make determinations about areas of particular concern.

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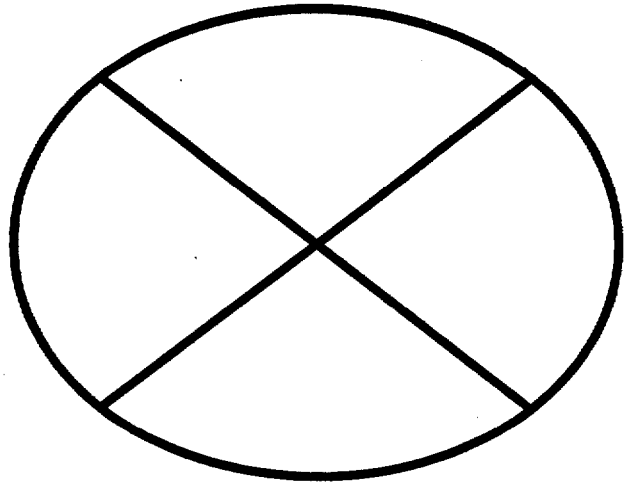

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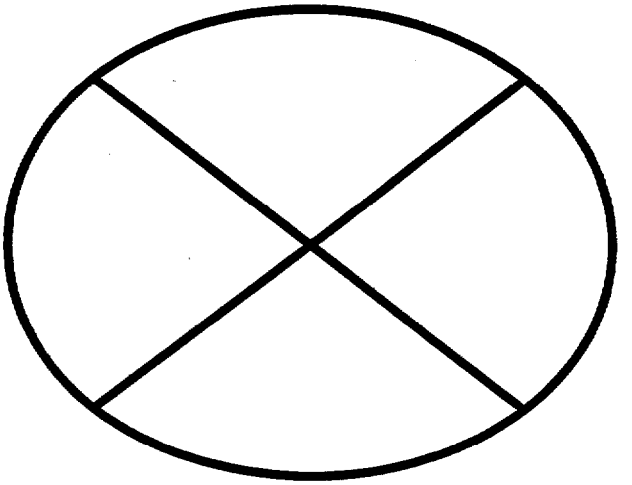

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AREAS FOR POTENTIAL DEVELOPMENT

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AREAS OF PARTICULAR CONCERN

CENTRAL NEW YORK COASTAL ZONE MANAGEMENT PROGRAM

PHASE I: TECHNICAL MEMO #9

SEPTEMBER 1975

INTRODUCTION

In the coastal zone the land meets the water, and this is an area in which processes depending on the interaction between land and water are most intense. It is both the occurrence of these processes, and for human beings -- who are land animals -- the simple presence of the expanse of water, that make the coastal zone unique. In Coastal Zone Management, it is necessary to identify areas of particular concern.

The concept of areas of particular concern can have many meanings depending upon the purposes to be served. The idea of "land suitability for development" is particularly important in this regard. This perspective gives emphasis to protecting distinctive natural features and natural systems. Freshwater wetlands protection, flood plain management, agricultural districts, and wild, scenic, and recreational river areas protection are examples of this approach. An added dimension of the land suitability approach is that of impact assessments of land and water use capabilities for development. Features often considered are: (1) natural conditions such as slope, bedrock, surficial geology, and soil characteristics; (2) natural hazards such as flooding; (3) ecologically sensitive areas such as significant wildlife habitats; and (4) other special historical or interesting features.

The following values are components of the methodology incorporated in selection of critical areas: (1) intrinsic qualities or characteristics of natural and man-made resources; (2) biological productivity; (3) protection of natural ecological systems; and (4) problems or hazards resulting from use not consistent with the nature of the resources.

Purpose and Scope

This memorandum describes efforts to incorporate various coastal natural resource and land use characteristics in a methodology for determination of the relative importance or value of those characteristics as they affect coastal activity. It utilizes the information derived from other technical memoranda in combination with a proposed methodology for assessing and describing such characteristics relative to potential conflicts between natural resource phenomena and land and water use.

In that this initial effort for determining areas of particular concern is based on Phase I activities of the CNY Coastal Zone Management Porgram, exact designation of all such areas is not possible. Rather, Phase I work enables identification of certain categories of information which will serve as the basis for future determination of areas of particular concern. At the conclusion of this memo, however, is a discussion of tentative geographic areas of particular concern.

AREAS OF PARTICULAR CONCERN IN COASTAL ZONE MANAGEMENT PROGRAM

In view of the foregoing discussion, the following categories have been developed for consideration of coastal zone areas of particular concern.

I Vegetation and Wildlife

1. Rare and endangered species of plants and animals
2. Prime forest areas
3. Productive wildlife habitats

II Soils and Geology

1. Shallow bedrock
2. Severe stoniness and rocky areas
3. Bluffs
4. Sand dunes
5. Poorly drained soils
6. Erodable soils
7. Mineral deposits
8. Excessive slopes

III Hydrology

1. Streams
2. Flood plains
3. Groundwater
4. Aquifers
5. Water tables
6. Ponds
7. Bays

IV Special physical features

1. Waterfalls
2. Dunes
3. Caves
4. Gorges
5. Bluffs

V Areas of scenic importance

1. Scenic vistas
2. Scenic transportation corridors

VI Historical and cultural landmarks and sites

1. Lighthouses
2. Forts
3. Indian sites

VII Recreation and other public use areas

1. Parks
2. Boat launching facilities
3. Fishing access points
4. Designated hunting areas
5. Game management areas

VIII Special Bio-physical areas

1. Shoals
2. Barrier beaches
3. Swales

IX Wetlands

X Agricultural areas

These categories should be viewed in light of the following discussion on the nature of areas of particular concern. These considerations may help to establish which areas are really critical and should have no development, and which ones are sensitive, yet may have a multiplicity of use with proper management practices.

DESCRIPTIVE COMPONENTS OF AREAS OF PARTICULAR CONCERN

Productive

Many areas are of particular concern because they are productive. Given sunlight, nutrients, water, and suitable habitat, plants and animals proliferate. As life is defined not only be irritability or responsiveness but by growth, without the proper combination of life sustaining components, productivity would cease. The Coastal Zone contains regions of very high biological productivity processes. Nutrient chemicals such as phosphates, nitrates, and biological trace elements are present in coastal areas. Because the coastal zone is shallow, the remains of the dead plants and animals that fall to the bottom are not lost from the near surface layer as they are in large bodies of water. These remains provide food for many species of benthic organisms, and the mineral nutrients regenerated by bacterial and biochemical action are brought back from the shallow bottoms into the sunlit zone by wind stirring and other shallow mixing processes. The high biological productivity of this region, as well as the ready accessibility of its resources to fishermen and hunters, is reflected in the fact that a major share of the harvest by commercial fisheries, and recreational fisheries, is taken from the coastal zone or immediately adjacent waters. In addition, the coastal zone contains various soils which are productive for a number of agricultural products. The productivity generated in many coastal areas contributes to excellent opportunities for designated hunting and/or game management areas.

Dynamic

The coastal environment -- land, water, plants, and animals -- does change. One can observe the procession of the evolution of matter and life, and the history and direction of time and forms. The concentration of energy and materials found in the coastal zone produce dynamic occurrences. Some of the changes of land form along the coast, produced by these concentrations of energy and materials, are cyclical, such as seasonal movements of beaches and bars produced by waves and currents. Other changes are unidirectional, such as the filling of unprotected shallows. Rises in water levels in addition to river erosion produces sediment traps. The currents that move and collect sediments along the coast will often sort them according to size and weight.

The shallowness of the water, beginning at some distance from the coast, has an effect on the concentration of the waters' energy at the coast. The concentration of energy of wave action can cause rapid change in shape as a result of dissipation of this collected energy. The position of bars may be changed; channels may fill in; beaches move up and down the shore and may even disappear completely.

Vulnerable

Some areas in the coastal zone are very intolerant to any human encroachment (e.g. primary sand dunes). Other areas, though more tolerant, are sensitive to human use and extreme natural processes to the extent that they need careful management. Man uses the coastal zone for extractive uses andfor such non-extractive uses as housing, recreation, and transportation. Ecologically it is an area of dynamic biogeochemical activity but with limited capacity for

supporting various forms of human use. In the coastal zone the land meets the water, and this is an area in which processes depending on the interaction between land and water are most intense. It is both the occurrence of these processes, and for human beings -- which are land animals -- the simple presence of the expanse of water, that makes coastal zone biotic, geomorphologic and man-made items vulnerable.

Functional

The ability of natural areas to provide protection and facilities is an important consideration in identifying areas of particular concern. Coastal wetlands, for example, can be extremely productive as mentioned in the section entitled "Productivity." In addition, coastal wetlands can also serve as buffer areas to prevent flood damage, and they moderate the force of waves on upland areas during storms. They are sinks for sediments because of the action of plants in slowing water flow. They absorb nutrients from the water, thus improving water quality in areas where sewage effluents are a problem.

Sand dunes are stalwart protectors of the above-mentioned wetlands. Dunes are astonishingly tolerant to high salinity, extreme glare, soils lacking humus, and an uncertain and oscillating supply of water. Dunes, stablized with grasses, provide greater protection than any concrete dikes. They accept the fury of waves, reducing their velocity and absorbing their mixed forces.

The possibility of erosion due to wind and water processes creates hazards to structures built on shifting dunes or eroding bluffs. Flood prone and prolonged wet areas present many dangers to development in these areas. The coastal zone also provides settings for many human uses. Park provide recreational areas near coastal zone resources. Boat launching facilities are dependent on the coastal zone, and public access to these facilities are of major concern in coastal zone planning.

Rare

Given various data on natural resources, we must we must interpret them with a value system to which man can respond. The coastal zone contains many phenomena of a limited and/or unique presence. Some of these may be man-made; others may be natural formations. In dealing with the concept of rarity, one must deal with questions which relate to the species in terms of a) the history, b) the environment, and c) the replacement. The following concepts should be applied:

1. Why is the item so rare today?

2. What are the environmental conditions most suited to its existence? Are these conditions available at the present time or how can management establish optimal or sub-optimal conditions?

3. What is the range of the item? Is it confined to one ecosystem or does it utilize several adjacent ecosystems?

4. What are the means of dispersal? What factors limit the replacement?

Such a series of questions may be applied to biological, geomorphological and man-made resources.

Unique Habitats

Many of the areas in the coastal zone contain special ecosystems which provide habitats for unusual plants and animals. Uniqueness is relative, of course, and connotes the abundance of certain phenomena, in combination with other phenomena, which together provide a given environment or display features not evident elsewhere. Unique habitats include points where rivers and streams meet the lake, semi-enclosed embayments, marshes, littoral and sublittoral mud flats and pools. In each of these habitats exist communities of plants and animals that are peculiar thereto. Some of the species have members which live only in these particular environments. Because of the richness and diversity of habitats, the coastal zone has an extremely varied, and in many respects unique, biota. Also, in some cases these habitats of the coastal zone are obligate environments of larger bodies of water, pelagic organisms at certain stages of their life histories.

Diverse

All elements in the biosphere possess degrees of importance in the succession of life. The environment, both physical and social, must offer maximum opportunity for development. Diversity is an important component of development -- the provision of the maximum opportunities. Coastal ecosystems are remarkably diverse systems where species, because of their location at the interface between land and water, are subject to extreme, and often violent environmental changes. Many species live near their tolerance limits, and environmental changes from human activities may result in the elimination of species. Possible changes in diversity are critical aspects of infringements on the coastal zone. Many previously diverse nursery food webs can be reduced to a simplified food chain of sewage-algae-tubificid worms-fish-man. Wehter from natural or man induced stresses, the end result is the same -- the destruction of certain ecosystems and often complete elimination of a species.

Scenic

Nature itself produces the aesthetic. The principles of ecology and its aesthetic characteristics are general, yet heavily value laden. The scenic value of a landscape, while occurring naturally, may be enhanced through public investment -- if for no other reason than simply the preservation of it.

About 30% of the total population of the U.S. lives within a 50 mile belf along our coastlines, representing only about 8% of the total land area. Due to immigration, the population of this coastal strip is growing more rapidly than the total population of the U.S. One important reason for this trend is the desirability of this area for scenic and recreational value.

Educational

The coastal zone contains a variety of natural and cultural features which can be found nowhere else. The observation of such features -- whether such observation includes measuring, analyzing, or simply viewing -- provide an educational experience to visitors to the caostal zone.

The recreational user of the countryside is the main target for the educational drive since he has come from his home into the area and is generally keen to find out about his surroundings. Certain aspects of the coastal zone can

provide exceptional opportunities for this process. The contemporary thought in biological education is to encourage discovery at an early age, and to build up a critical ability during the subsequent stages of education.

A supply of educational experiences for both children and adults are found in the coastal zone, and therefore deemed critical and should include at least the following:

1. Contain the diversity required for the demonstration of a wide range of habitats, communities, and species, and the operative ecological factors.

2. Contain rare features not easily demonstrated elsewhere.

3. Be reasonably accessible.

Bountiful

Very few environments contain the primary constituents and characteristics in such a combination as to promote complexity, durability and production of wildlife. The coastal zone contains such environments.

Scattered wetlands and streams and rivers along the Lake Ontario shore are important loafing and feeding areas for migratory birds. While open water is used primarily as a resting area, the shoals and marshes are used for resting, nesting, and feeding. Shallow water is one of the prime requirements for the production and maintenance of waterfowl populations as well as many other forms of animal life. It is used as spawning grounds for many Great Lakes fish.

Harvest is a function of game population density, habitat quality, and access. The assurance of abundant game and other wildlife present in the coastal zone is of permanent concern in coastal zone management.

Determination of Areas of Particular Concern

The preceding discussion of criteria for evaluation of critical areas reveals relative values of concern for their use. In all land uses, environmental considerations must be taken into account when determining compatibility and incompatibility.

One way to determine the relationship of critical areas and other natural determinants to land uses is to construct an interpretive matrix for each resource and each related use in the coastal zone. The aim is to evaluate the relative criticality of each portion of land. The uses of the resources are listed down the left side of the matrix; the variables which describe the characteristics of the land are listed across the top. Criticality ranks are assigned on a scale of one to ten, with ten the most critical. The variables themselves can be assigned weights which may differ among the different use categories to account for their relative importance in evaluating the suitability of the resource for each use. These weights are multiplied by the criticality scores, and the weighted scores summed over all the variables. Those areas with totals above a threshold level for one or more uses may be designated as of particular concern.

This approach is an attempt to provide a somewhat objective estimate of "criticality." Judgments, however, are required in assigning relative weights

of each variable to each use. The same is true where different scoring is given to each variable because of its relative importance. A brief example of such a process is given in figure 1 for vegetation and wildlife.

The scoring and weighting process should be done by planners, decision-makers, and the public. Extensive data are required for proper use of this technique; explicit statements on scales used, why they were chosen for specific data, and what professional judgments are involved are necessary. Further, it is important to see how totals of rating are interpreted into meaningful conclusions. This methodology is beyond the scope of work in Phase I, however, and will be advanced in Phase II.

Such a process may be used to designate areas of particular concern. Once critical combinations of uses and resources have been isolated, various areas of particular concern may be mapped.

CRITICALITY MATRIX FOR VEGETATION AND WILDLIFE

Vegetation & Wildlife Categories	Rare & Endangered Species		Prime Forest Areas		Productive Wildlife Habitats		Total Weighted Scores	Critical[2]
Importance Weight 3=highest 1=lowest	3		1		2			
	Raw[1] Score	Wgtd. Score	Raw Score	Wgtd. Score	Raw Score	Wgtd. Score		
Direct Use:								
Extractive								
Agriculture	8	24	10	10	10	20	54	X
Fishing	10	30	N.A.		1	2	32	
Hunting	10	30	1	1	1	2	33	
Mining	10	30	10	10	10	20	60	X
Drilling	10	30	10	10	10	20	60	X
Collecting	10	30	1	1	2	4	35	
Non-Extractive								
Swimming	1	3	N.A.		1	2	5	
Bird Watching	1	3	1	1	1	2	6	
Picnicking	7	21	3	3	5	10	34	
Research	1	3	1	1	1	2	6	
Education	2	6	1	1	1	2	9	
Camping	8	24	5	5	6	12	41	
Touring	7	21	5	5	5	10	36	
Marinas	10	30	N.A.		10	20	50	X
Shipping	10	30	N.A.		10	20	50	X
Indirect Use:								
Power Generation	10	30	10	10	10	20	60	X
Industry	10	30	10	10	10	20	60	X
Institutions	10	30	10	10	10	20	60	X
Military	10	30	10	10	10	20	60	X
Housing	10	30	10	10	10	20	60	X
Waste Disposal	10	30	10	10	10	20	60	X
Access Roads	10	30	8	8	10	20	58	X
Urban Complex	10	30	10	10	10	20	60	X

Figure 1

[1] 10=highest criticality
1=lowest criticality

[2] Score 50 or over

CONCLUSION

The competition for land in the coastal zone necessitates a careful management of resources and growth. Certain ecological and man-made structures and systems are highly sensitive to varying degrees of use. Certain areas, such as sand dunes, are sometimes negatively affected by simply walking on them, other areas require much more intensive use before they are adversely affected.

Before one can determine which areas are of particular concern, the descriptive components outlined in this study should be considered. In addition, an interpretive matrix such as the one described in this report will help in determining areas of particular concern if the extensive data needed for such a process is gathered.

Recommendations

1. Extensive data should be collected identifying resources and land uses in the coastal zone.

2. Refine and expand the methodology suggested in this report for determining areas of particular concern through a more comprehensive inventory and analysis of resources in the coastal zone.

3. A pilot study should be undertaken to test the methodology's applicability to coastal zone management and planning.

4. Coordinate aspects of our 208 program, 701 program, and Upstate Port Study in consideration of environmental and other issues relative to areas of particular concern.

5. Incorporate information from other task items on natural resources and land use into methodology.

6. Continue development of criticality matrices for other categories.

Areas of Particular Concern

Area Types	Technical Memo Reference	Criteria
Viable Agricultural Land	5,8,9	Regional and local plans call for protection of areas of viable agricultural land from development encroachment. They are productive and functional.
Dense Forest	6,8,9	Dense forest areas in the coastal zone are limited. Areas presently in existence should be surveyed and managed accordingly. These areas are productive, functional, scenic, and often contain unique habitats.
Low Plain	5,9	These areas are subject to flooding and erosion and are not suitable for development. They are vulnerable.
Artificial Fill	5,9	These areas are subject to erosion and have low compactibility. They are vulnerable.
Flood or Wave Action	3,4,5,6,8,9	Exposure to wave action or flooding make these areas unsuitable for intensive development. Hazards may result from storms and floods. These areas are dynamic, and vulnerable. The wetlands in these areas are also productive, diverse, educational, bountiful and often contain unique habitats.
Bluffs	5,6,9	Bluff texture and construction are important in erosion and protection of the bluff. No construction should be allowed on unstable, erosion prone, or seepage prone bluffs. They are dynamic, vulnerable, rare, scenic, educational, and often have unique habitats.

Sand Dunes	4.5,7,9	Sands dunes are highly sensitive to both intensive and casual use. They are dynamic, vulnerable, functional, rare, scenic and educational.
Ledge Rock	4.5,9	Ledge Rock is a beach material which is important in preventing erosion. It is scenic, functional, and educational.
Wildlife and Vegetation	3,4,5,6,8,9	These areas contain various unique and/or endangered wildlife habitats or vegetation cover which are sensitive to development. They are productive, dynamic, vulnerable, functional, rare, diverse, scenic, educational, and bountiful.
Scenic Vistas	5,6,8,9	Certain points along the coast offer unique and aesthetically pleasing areas for viewing. These should remain uncluttered and accessable.
Historic Places of Interest	8,9	These man-made structures are unique places for education and recreation. They are vulnerable, functional, rare, scenic, and educational.

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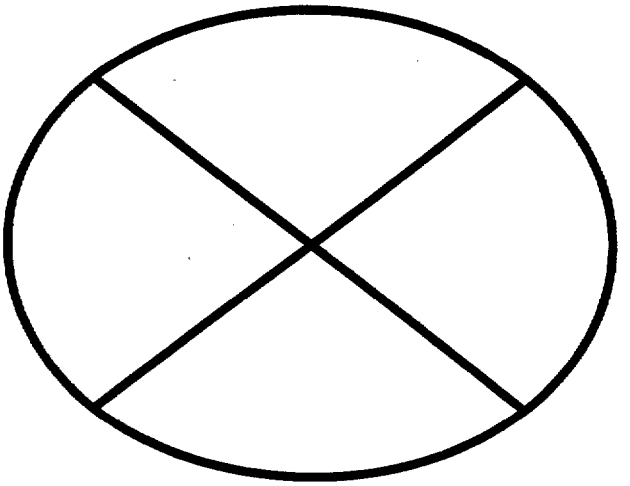

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PUBLIC PARTICIPATION ACTIVITIES

Public participation efforts in Phase I of the Central New York Coastal Zone Management Program were addressed in three ways: public information dissemination, public and private meetings, and technical advisory committee activities.

PUBLIC INFORMATION DISSEMINATION

RPDB publicized the Coastal Zone Management Program through two articles in its newsletter, Destiny, and press releases to newspapers and television and radio stations (copies of the newsletter, a copy of the newspaper press release, and one of the news stories on the CZM program are appended).

MEETINGS 19

RPDB staff held or attended numerous meetings with public and private groups and individuals. The following listing indicates the date, place, and participants:

15-16 Mar.'76 — Statewide CZM Workshop and Conference, Albany; all state contractors

11 Feb.'76 — Speech to SUNY College of Environmental Science and Forestry on CZM Program, Syracuse

4 Feb.'76 — Meeting with Sierra Club to discuss Coastal Zone progress; Syracuse, RPDB office

11 Feb.'76 — Presentation on Coastal Zone program to Cayuga County Planning Board, public & press; Auburn

20 Jan.'76 — Meeting with Sea Grant to discuss Coastal Zone program; Syracuse, RPDB office

8 Dec.'75 — Coordination meeting on Coastal Zone program with BR-SL RPB, Jefferson County PB, SLEOC; Watertown

8 Dec.'75 — Meeting with Sierra Club to discuss Coastal Zone Program; Syracuse, RPDB office

3 Dec.'75 — Large public meeting; discussion of Coastal Zone Program, boundary options, and so on; approx. 60 attended; North Syracuse

2 Dec.'75 — Meeting with Sierra Club; Syracuse, RPDB office

25 Nov.'75 — Meeting with Sierra Club; Syracuse, RPDB office

4 Nov.'75 — Meeting with Sierra Club; Syracuse, RPDB office

28 Oct.'75 — Meeting with Sierra Club; Syracuse, RPDB office

30 Sep.'75 — Meeting with Sierra Club; Syracuse, RPDB office

18 Sep.'75 — Presentation of Coastal Zone Program to public to public group, RPDB Quarterly Board Meeting; Cazenovia

5 Aug.'75 — Meeting with Sierra Club; Syracuse, RPDB office

3 Jun.'75 — Coastal Zone coordination meeting with DEC and other contractors; North Syracuse

Spring '75 Date Unknown — Presentation to Cayuga County Planning Board and press on Coastal Zone Program

Spring '75 Date Unknown — Presentation to Oswego County Planning Board and press on Coastal Zone Program

Spring '75 Date Unknown — Presentation at RPDB Board Meeting on Coastal Zone Program

TECHNICAL ADVISORY COMMITTEE (TAC)

RPDB initiated public participation activities through creation of a small TAC comprised of five persons from Cayuga and Oswego Counties:

Erwin Fineout — Member of Fair Haven Village Board and Cayuga County
Fair Have, N.Y. and Cayuga County Planning Board; former superinten-
(Cayuga County) dent of Fair Haven State Park

Robert Miller — Oswego County Legislator and member of RPDB Board
West Monroe, N.Y.
(Oswego County)

Dr. Richard Moore — Director of Lake Ontario Environmental Laboratory
Oswego, N.Y. (LOTEL), SUNNY at Oswego; member of Oswego County
(Oswego County) EMC

Patricia Walrath — Member of League of Women Voters and RPDB Board
Auburn, N.Y.
(Cayuga County)

Hon. John Zagame — NYS Assemblyman, 117th District; member RPDB
Oswego, N.Y. Board
(Oswego County)

Altogether, the TAC met three times as a group with staff from Cayuga County Planning Board, Cayuga County EMC, Oswego County Planning Board, and RPDB. There were other individual meetings between staff and TAC members as well. Appended are meeting summaries.

The purpose of the CZM TAC is to provide citizen input and guideance for the conduct of the Coastal Zone Program. The TAC has been extremely helpful in identifying problems and issues in Central New York coastal areas and providing much information on several of these problems. Each member brings considerable experience and background to the Coastal Zone Program on a variety of issues: development of land and water uses, hazardous materials pollution (PCBs), water quality, parks and recreation, wetlands, power plant siting issues, and general environmental issues. The TAC has been instramental in making adjustments to the proposed CNY coastal zone boundary options, providing information on parks and recreational facilities such as boat launching sites and harbors, indicating experiences with the salmon fishing program of the Eastern Lake Ontario area, identifying local problems in North Sandy Pond, the current status of the proposed State acquisition of Deer Creek Marsh and developer encroachment therein, providing considerable information on PCB characteristics, and so on.

The TAC suffered a setback recently with the resignation of Dr. Moore from LOTEL on 1 January 1976; Dr. Moore has left the area to take a new position on the Atlantic coast. However, the Chairman of RPDB has already met with the new director of LOTEL, Dr. Anthony Van Geet, and staff will meet with him soon to discuss the CZM program. Dr. Van Geet will be asked to accept an appointment to the TAC.

In addition to the new appointment mentioned above, TAC membership will be expanded in Phase II in accordance with RPIB and State objectives.

COASTAL ZONE MANAGEMENT TECHNICAL ADVISORY COMMITTEE

Summary of 19 December Meeting

1. Fineout, Miller, Moore, and Walrath present, (Assemblyman Zagame in Albany); Cayuga County staff, LOTEL staff, and RPDB staff present.

2. Bob Anderson reported that he had checked on the possibility of amending the work porgram to do a study of the PCB problem this phase; RPDB staff had determined it to be too late to amend the contract for Phase I. This item will be explored in Phase II.

3. CZM Boundary at Cayuga/Wayne Border: Bob Anderson reported that he had checked with the Genesee-Finger Lakes Regional Planning Board regarding its proposed boundary. Presently, GFL is proposing to draw the boundary parallel to Blind Sodus Bay Road in Wayne County to the northeast bend in the road, and then east to a point just south of Meadow Cove on Little Sodus Bay. He suggested that they move their boundary south so that it meets ours on Old State Road at the Cayuga-Wayne County boarder. They are going to consider this.

4. The major item on the agenda was a review of Phase I technical memoranda prepared by staff; Bob Anderson summarized the work-to-date.

5. Drafts of the generalized proposed Phase II work program were distributed.

6. On the subject of obtaining better surface drainage information on the smaller streams in the Eastern Lake Ontario Basin, Dick Moore mentioned that Rochester Gas & Electric may be willing to assist us. Bob Anderson will contact the appropriate people.

COASTAL ZONE MANAGEMENT TECHNICAL ADVISORY COMMITTEE

Summary of 24 October Meeting

TAC Members Present: Erwin Fineout, Richard Moore, Patricia Walrath
Staff Present: Jim Carr & Bob Brower, Cayuga County Planning Board; Bob Anderson, RPDB

DISCUSSION ITEMS

1. PCB's -- Dick Moore gave a brief explanation on known characteristics of PCB's, including health hazards and concentration levels in the food chain. While some things are known about PCB's, much is not known regarding the health effects of specific concentrations in humans.

   Regarding the possibility of utilizing CZM program funding for more research, Bob Anderson reported that although actual scientific analyses of PCB problems are beyond the scope of the program, CZM funds may be used for a review of pertinent literature from which recommendations could be drawn and made to appropriate state agencies. Bob Brower and Pat Walrath suggested that we determine if LOTEC could be contracted with to do this work. Bob Anderson will check and report back.

2. Sewage Treatment Funding and 208 Water Quality Planning -- Bob Anderson reported that according to existing water quality rules and regulations, a municipality which is not identified in the final water quality plan as needing waste treatment facilities would not be eligible for federal funding. However, since at many municipalities are likely to be in this category after water quality planning is completed (nationwide), there will be a great need to assist them. Apparently, EPA is considering revising its rules and regulations to meet these needs.

   The likely revision to the rules notwithstanding, the CZM program like any other federal, state, or local program may consider the needs of these smaller towns and villages and transmit recommendations to the water quality agency (in our case, the same). The staff working on water quality is obligated to consider these recommendations and incorporate them into its planning process.

   Another mechanism for consideration of waste treatment needs is the mandatory) annual update and revision to the water quality plan. Every year after completion of the plan, the water quality agency must review and, if warranted, incorporate revisions into the plan. These may include recommendations to fund waste treatment facilities for municipalities not previously scheduled for them.

3. CZM Boundary -- TAC members reviewed Technical Memo #2 on the selection of a coastal boundary for Central New York. Generally, those present favored the broadest area for study purposes. Erwin Fineout suggested that we delete that part of the proposed boundary line which runs along the Cayuga-Wayne County border. We decided to do this; Bob Anderson will check with the Genesee-Finger Lakes Regional Planning Board to ensure consistency with their border.

4. CZM Program -- Bob Anderson gave brief explanation of this year's program and how it fits with the work program in our contract. We are proposing a series of ten technical memos to meet the contract for this phase. Erwin Fineout suggested that we consider parks and boat launching facilities in our study and recommendations. We will do this and incorporate this aspect in the memo on land and water use.

The meeting ended at 2:00 when the DEC Need Control hearings began. No next meeting was scheduled.

COASTAL ZONE MANAGEMENT TECHNICAL ADVISORY COMMITTEE

Summary of 10 October Meeting

1. All five members of CZM TAC (see attached list) were present: in addition staff from the three planning boards attended: Bob Brower, Cayuga County Planning Board; Al Hawkins, Oswego County P.B.; and Bob Anderson, RPDB.

2. Bob Anderson presented an overview of the federal, state, and local coastal zone programs.

3. From this point on, the meeting can be characterized pretty much as an open discussion of problems and issues related to the coastal zone. Listed below are some of the subjects covered:

   (a) North Pond - The committee and staff people identified problems of pollution, weed growth, erosion, and seasonal and permanent development adjacent to pond.

   (b) Little Sodus Bay - Discussion was similar to that on North Pond.

   (c) PCB (polychlorinated biphenyl) - Group identified numerous problems and potential health hazards associated with PCB. Apparently there is a great deal of confusion regarding the threat to health; DEC hasn't helped the problem any with announcements regarding consumption of fish.

   We are as yet unsure of the 208 program regarding PCBs: this will be cleared up by next meeting.

   Also, there is a question as to whether the CZM program can attempt to deal with PCBs -- getting more information, measuring extent of problem, etc. -- since CZM is primarily a land management program. We all pretty much agreed, though, that if possible, we should look into doing more research.

   Dick Moore will do a search of exising literature and report at next meeting. Bob Anderson will determine possibility of CZM program funding for more research.

   Mercury pollution problems were also mentioned.

   (d) Sewage Treatment Funding and 208 - Committee members (and staff as well) want to know what happens to small rural community if not included in 208 plan; i.e., if not identified as in need of sewage treatment facilities under 208, is there going to be any federal funding?

   CZM might consider this as an aspect of the program. Bob Anderson will report at next meeting on 208's role in this problem.

   (e) Deer Creek Marsh - Committee and staff identified problems associated with marsh; encroaching development, pollution, etc. We generally agreed that we should give this more attention; possibly, we could recommend acquisition with New York State Environmental Board funds.

(f) Power Plant Siting - although recognized as a critical problem, a couple of people mentioned that it is a huge job to deal with and get involved in power plant siting. environmental impacts, etc. Also, CZM program funding may be entirely too limited to get involved in this.

4. Staff Work For Next Meeting - Bob Anderson will:

(a) see to it that each member has list of all other members' names and addresses.

(b) send out CZM policies paper to members for review

(c) send out CZM boundaries paper for review

(d) provide written summary of CZM program

(e) explain the committee's role and standing in relation to the RPDB Board

5. Next Meeting

Friday, 24 October at 10:00 a.m. Cayuga County Planning Board, Auburn

Autumn Citizen - Advertiser

CA - 9/20/74

Coastal zone projects, budget topics at planning board meet

The Cayuga County Planning Board focused on coastal zone planning and a proposed 1974-75 budget at its meeting Wednesday night.

Bob Anderson, representative of the Regional Planning Board, said that the purpose and scope of federal legislation making available funds to New York State for coastal zone planning was to restore and preserve coastal areas along the Hudson, St. Lawrence, Lake Ontario and Long Island and to encourage the state to instigate its own program of management.

A fund of $100,000 has been allocated for the cities, towns and villages in the coastal zone regions but it would probably be administered through regional and county agencies, Anderson said. An additional $87,500 has been earmarked for the 28 counties bordering the coast and $87,500 for regional agencies on the coast.

The initial phase of the program will be to set aside funds to: determine the coastal zone boundaries; to make land and water use analysis; to identify natural resources; to explore economic development of coastal areas; and to develop intergovernmental processes to manage the program.

The second phase of the program provides for funds to insure that the recommendations of the study period are put into effect.

"It won't mean a great deal of money," said Jim Carr, planning director, "but we can be reimbursed 100 per cent for things we may really have to do along the coastal areas."

"It will be very easy to duplicate the functions of the Ontario-St. Lawrence Basin Commission," said Anderson, "so we will be watching the coordination of agencies closely to prevent this."

"I personally feel that the county effort of all the agencies with jurisdiction, will be the most important," said Assemblyman Steve Riford, planning board member. He said he hoped that with the overlapping jurisdictions, the planning board on the county level would not be the one to suffer.

The 1974-'75 budget, which must be submitted to the Cayuga County Legislature, did not represent any significant changes or increases, said Henry Tamburo, chairman of the board. The requests for 1975 were incomplete, said Carr, because salary negotiations with the Civil Service Employees Association were still in process.

Under anticipated revenues, Carr said he did not expect funds from the Emergency Employment Act which is being phased out. New sources of revenue listed were the Comprehensive Educational and Training Act, successor to the Emergency Employment Act, and funds from the Coastal Zone Planning program. Revenues for 1974 were estimated at $117,500 and $110,700 for 1975. "Revenues for 1974 are running below the estimated figure," said Carr, "but expenditures are running low too. If all goes well in 1975, we'll do better than the estimated figure."

A list of proposed salaries for the planning staff was attached to the budget. The board voted to submit the budget for legislative consideration with one change: that funds for health planning be listed as a separate item and not under contractual expenses.

"I don't think there's another planning board in New York State which administers a comparable program with the same amount of funds," summarized Dave Farrell, county treasurer.

Tamburo welcomed new board member Kathy Muldoon and accepted the resignation of Adele Prudem effective immediatey.

Oswego Palladium-Times

(p.1) OP-T 8/24/75

Grant Will Develop Coastal Land Zones

The Central New York Regional Planning and Development Board (RPDB) announced today that it has received approval of a $20,000 grant to finance a coastal zone management program for Central New York. The program is funded by the National Oceanic and Atmospheric Administration.

The RPDB, assisted by the Oswego and Cayuga County planning boards, will use funds granted to the New York State Department of Environmental Conservation (DEC) under the federal Coastal Zone Management Act. Passed in 1972, the act calls for the protection and development of the land and water resources of the nation's coastal areas.

Twenty-eight counties, including Oswego and Cayuga counties in Central New York, border coastal waters. Increased population and economic development have placed new demands on Lake Ontario and adjacent shorelands. These areas possess important scenic characterisitcs and ecological values which are threatened by this development.

Under the coastal zone act, states which adjoin coastal waters are responsible to study coastal resources, to develop plans to guide the use of these areas, and to develop management programs to ensure that the plans are implemented.

A major objective of the program is to define the "coastal area" based on the degree of influence which Lake Ontario has on regional land and water uses and natural characteristics. The RPDB will analyze these uses especially those which endanger natural resources. Coordinated activities to protect these coastal waters and shorelands will include holding workshops and inventorying applicable regulations in effect.

Within a month, the RPDB and the Cayuga and Oswego county planning boards will choose a tentative boundary for the coastal zone which then must be approved by the state.

RPDB members from Oswego county are Chairman Vernon E. Rank, professor, SUNY at Oswego; RPDB Secretary-Treasurer John C. Myers, Oswego County Treasurer; Arthur J. Clawson, area industrial director; Joseph Fistick, Chairman of the Oswego County Planning Board; Donald I. Gleason, Oswego County legislator; Robert Miller, Oswego County legislator; John Schneider, Oswego County Highway Superintendent; and John R. Zagame, NYS Assemblyman 117th District.

Central New York's RPDB destiny

"It's in your hands"

CENTRAL NEW YORK
REGIONAL PLANNING AND
DEVELOPMENT BOARD

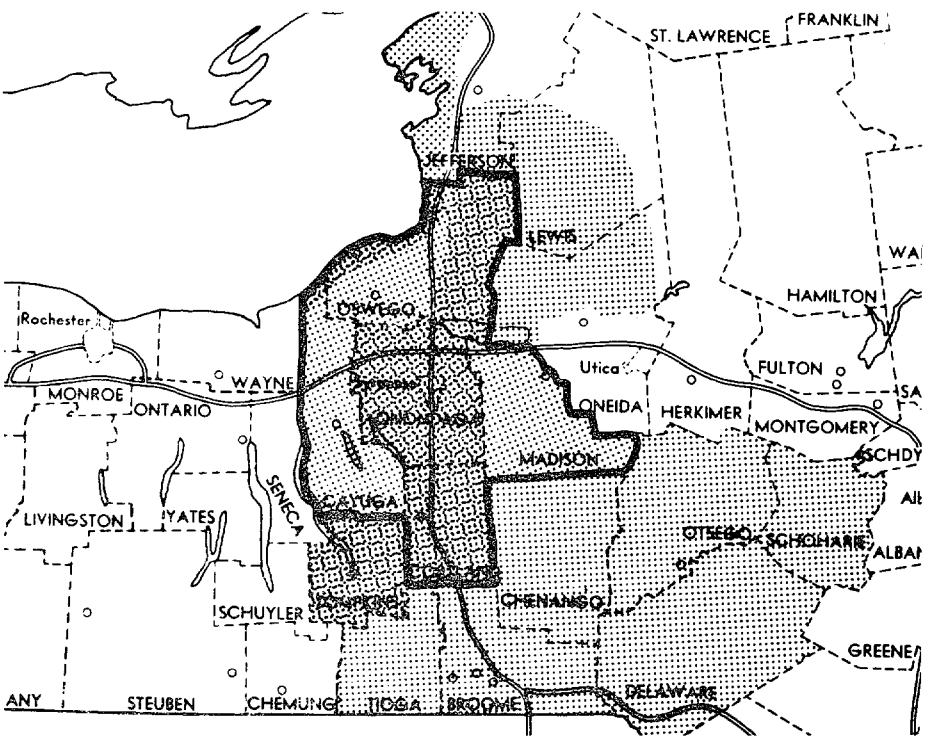
IS OUR PLANNING BEING PLANNED ?

The Central New York Region has many planning and planning-related agencies. Community leaders, law-makers, and concerned citizens frequently raise questions. Are these all necessary? Do they do different things? Are they working together? What do we do about this request to create still another?

Assemblyman L.S. Riford, Jr., an RPDB vice-chairman, called together his colleagues who represent this Region to discuss these key questions in December of last year at the RPDB Annual Meeting. At an afternoon workshop RPDB chairman Thomas H. Dyer and the planning staff identified about 10 or 12 agencies, which seemed to be considered most similar, or about whom seemed to be the most confusion.

Because of the number of agencies and the limitations of time, only basic information such as the geographic area covered, the sources of funding, and the primary purpose or function of each agency could be presented. However, the presentations stimulated an animated discussion as to real or alleged conflicts and what should or could be done about them.

Our State legislators commented to Riford and the Board that, while they were pleased with the informative meeting, they hoped that in subsequent meetings we would use that as a starting point and pursue in more depth the matter of *inter-agency coordination.* The Board of course agreed, and the legislators were invited back to the RPDB's 1974 Annual Meeting on December 11 at the Sheraton Inn in Syracuse.



Among the agencies selected for discussion are the following:

The New York State Office of Planning Services promotes comprehensiveness and coordination in planning and development activity through direct planning efforts, the review of plans and projects, and financial support to local planning.

Regional Planning Boards fill the gap between state and local planning, and are in a strategic position to integrate state and local government investment.

County Planning Boards are in the best position to provide continuing planning assistance at the local level. The county acts as the local administering unit for state and federal programs.

Areawide and Local Planning for Health Action, Inc. is the state-designated health planning agency, charged with coordinating physical, mental, and environmental health activities.

The New York State Department of Transportation (DoT) coordinates the development and construction of highway and similar facilities in the state and supports operation of related services.

Urban Area Transportation Studies are local cooperative efforts to assist NYS DoT in making local transportation plans.

New York State Department of Environmental Conservation is the state agency for environmental control and has air, water, and land use responsibilities.

Tug Hill Commission is a temporary commission created to study the unique physiographic area of Tug Hill, including conservation and development of its natural and cultural resources.

(continued on page 2)

Planning agencies

St. Lawrence/Eastern Ontario Commission encompasses a shoreline area with a variety of land uses, including industrial and commercial sites, recreation facilities, farmland and public parks, and the St. Lawrence Seaway. In formulating its plan, the Commission must determine land uses that are compatible with the context of the natural and economic environment.

County Environmental Management Councils were created by all of our counties and are advisory to them on environmental matters within the counties.

Economic Development Districts are responsible for preparing one and five-year investment programs and for aiding localities in applying for grants to help fill their needs.

Local Development Districts - The Southern Tier East Local Development District encompasses eight counties including the Central New York county of Cortland and administers Appalachia programs throughout that area.

Oswego transportation study begins

To investigate the need for transportation improvements in the developing Oswego-Fulton "corridor," the New York State Department of Transportation (DoT), has revived the Transportation Study first begun there several years ago. The 1962 Federal-Aid Highway Act called for the establishment of such programs of a "continuing, comprehensive, and cooperative transportation planning process" in each urban area of more than 50,000.

Because it is primarily a planning activity, the two committees formed are headed by Oswego County's planners. The Policy Committee, which consists of officials such as county legislators, mayors, and aldermen, is headed by Oswego County planning board chairman Joseph Fistick, who is also an RPDB member. This Committee sets the goals and objectives, determines the policies, and generally guides the activities of the Study.

Oswego County planning director Alman Hawkins chairs the Planning Committee, which does the preliminary work of a more technical nature, and is therefore composed of the planners, engineers, and other technical people responsible to the policy officials.

Region-wide agencies such as the RPDB, the Regional Transportation Authority, and the New York State DoT, also have participants on both committees. New York State DoT, which created the original study, provides staff service, and the recommendations of the Study must have its concurrence.

A similar study, known as the Syracuse Metropolitan Transportation Study, has been underway in Onondaga County since 1966.

DID YOU KNOW THAT...

As an information clearinghouse for Central New York, we get a lot of questions.
Are you aware of these regional facts?

• There are approximately 1312 miles of State highway in Central New York (Cayuga, 270; Cortland, 198; Madison, 170; Onondaga, 386, and Oswego, 288).

• There are 20 public and eight private airports in the Central New York Region.

• Radisson, the Region's new planned community, is one of four "new towns" in New York State.

• Cazenovia Lake is the cleanest lake in the Region; Onondaga is the most polluted, probably the dirtiest in the State.

• The Region's surface waters drain north to the St. Lawrence, east to the Hudson, and south to the Susquehanna.

• 800 industrial operations in Central New York occupy 12,000 acres of land and employ approximately 97,000 people.

• The Barge Canal is still in operation, and in 1973 more than 2½ tons of commodities were transported on it to Syracuse.

• There are approximately 247,838 dwelling units in Central New York, of which 6,505 are mobile homes.

• The Tug Hill area in Oswego County receives the most precipitation in Central New York, in some areas over 55 inches per year.

• Each of the 760,000 persons in the Central New York Region in 1970 generated approximately a ton of solid waste that year.

• 65 per cent of the Region's population is over 18, and 10 per cent is over 65 years of age.

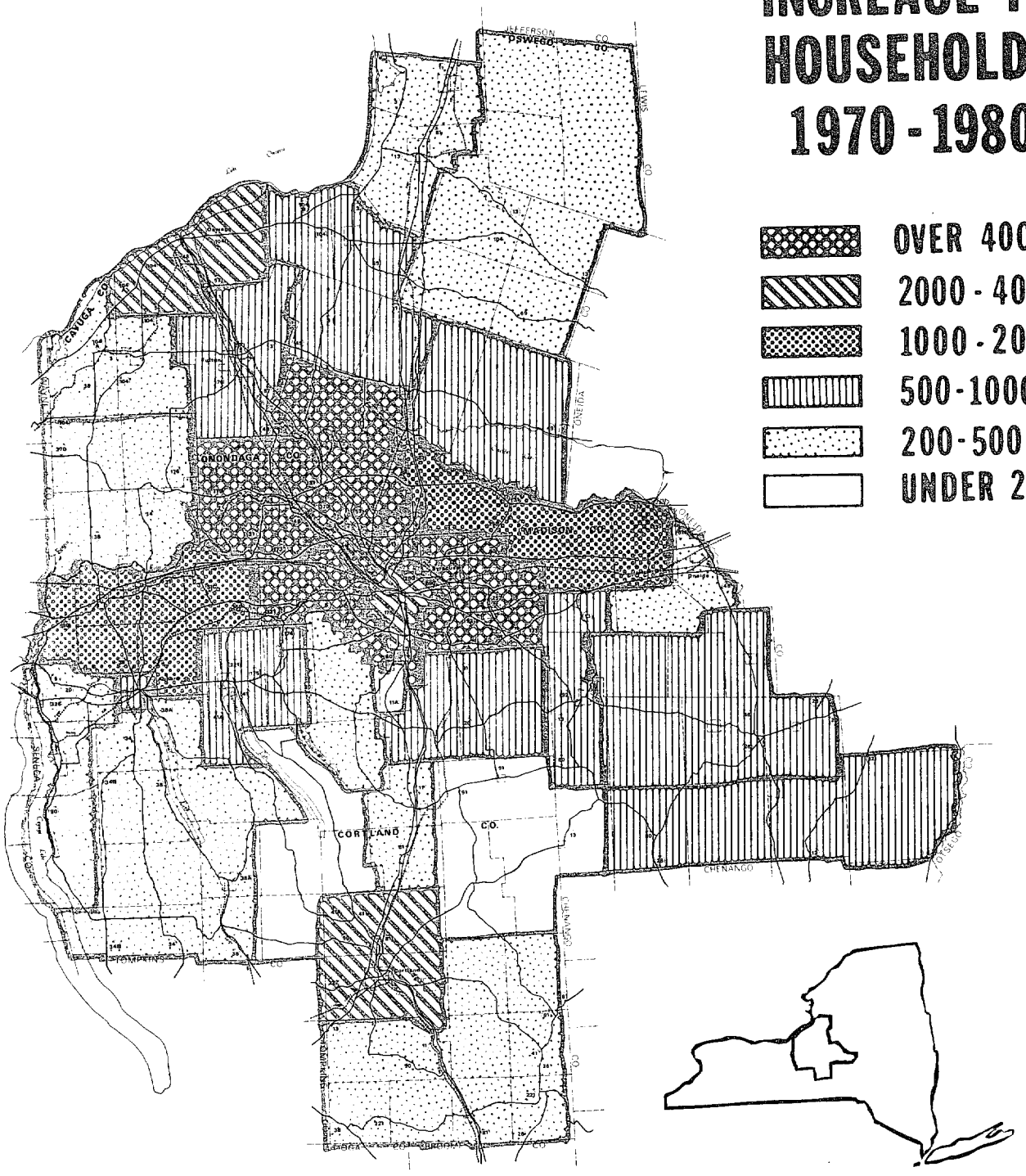
RPOB

INFO MAP

WHERE IS THE HOUSING DEMAND BEING CREATED?

The map below shows anticipated increases in households between 1970 and 1980 in the Central New York Region. "Household" is defined as all the persons who occupy a housing unit (whether a house, apartment, group of rooms, or single room intended to be separate living quarters), and includes not only families but unrelated individuals. To give the averages more meaning, we have divided the Region into 30 planning areas, as similar as we could make them in land uses, transportation access, natural features, utilities and services provided, influence of large industrial and commercial complexes, and stage of development (for example, urban, suburban, and rural). Note that the largest concentration of growth is anticipated in the suburbs north, east, and west of Syracuse.

THE CENTRAL NEW YORK REGION



INCREASE IN HOUSEHOLDS 1970 - 1980

- OVER 4000
- 2000 - 4000
- 1000 - 2000
- 500 - 1000
- 200 - 500
- UNDER 200

RPDB PREPARES HOUSING PLAN

Inflation has left its mark on housing, as it has on many other aspects of the American economy. It has had particularly disastrous effects on lower-income groups. How do we provide adequate housing for *everyone* at an affordable price? What's more, how do we provide the proper types of units in the right places to satisfy a diversity of needs? Differing incomes, lifestyles, and space needs of young and old families, singles, the aged, and the poor must be considered. We not only are *not* meeting these needs in Central New York; we are falling behind with each passing month.

WHY A REGIONAL PLAN?

That's why the Central New York RPDB has undertaken to develop a region-wide housing plan. Why regional rather than county? Well, for one thing, various indicators such as commuting patterns show that the *problem* is regional in nature. The housing problem is largely economic, and Central New York is an economic unit. We expect many factors contributing to a solution will be economic as well.

For another thing, the Federal government has established August 1977 as the date by which all local governments must have a housing plan or become ineligible for federal financial assistance for community development. The regional housing plan will either qualify those communities or give them the necessary basis for qualifying plans. Our counties will remain eligible by virtue of our regional housing plans.

THE PLAN'S OBJECTIVES

The main purpose of the plan, however, is the same as the rest of our plans - - - to work out the most efficient, effective, and satisfactory way to solve a major problem. It will tell us in specific and useful terms the nature and extent of our problem. It will identify as well as possible the special needs for low and moderate-income people, and for the elderly and for minorities. It will identify the more desirable locations for future housing in the Region, based on many factors, such as nearness to employment centers, highway accessibility, the availability of urban services, and the absence of development problems.

The plan will also deal with legislative and financial obstacles, and will set forth the various techniques, options, and programs available for our use in tackling this problem of securing one of the most basic of all our needs, adequate housing.

"Planning without implementation is futile; implementation without planning is chaos."

Dennis O'Harrow

RPDB PUBLICATIONS OF INTEREST

Much of what the RPDB publishes can be helpful to you as well as to our Board members. The first four publications below, for example, are presented in highly readable, non-technical language for use by the general public. For those of you who would like more technical material, we invite you to look at the remainder of the list. If you would like copies of any of the reports listed, or would like information on other planning topics, please feel free to write or call the RPDB office.

- REGIONAL GOALS, OBJECTIVES, AND POLICIES
- A PLACE TO LIVE (HOUSING BROCHURE)
- CNY REGIONAL SOLID WASTES MANAGEMENT PLAN
- DIRECTORY OF ENVIRONMENTAL ORGANIZATIONS IN CNY
- ENVIRONMENTAL RESOURCES MANAGEMENT HANDBOOK
- SOIL INTERPRETATIONS
- GEOLOGIC INVENTORY
- MINERAL RESOURCES ANALYSIS
- UTILITY SERVICES
- A MANUAL FOR EVALUATING DAY CARE CENTERS

Board begins coastal zone management program

The RPDB has received notification from Deputy Director Henry Williams of the New York State Office of Planning Services (OPS) that it will be given $20,000 to finance a coastal zone management program for Central New York. The RPDB, along with the Cayuga and Oswego county planning boards, will utilize funds granted to OPS under the federal Coastal Zone Management Act.

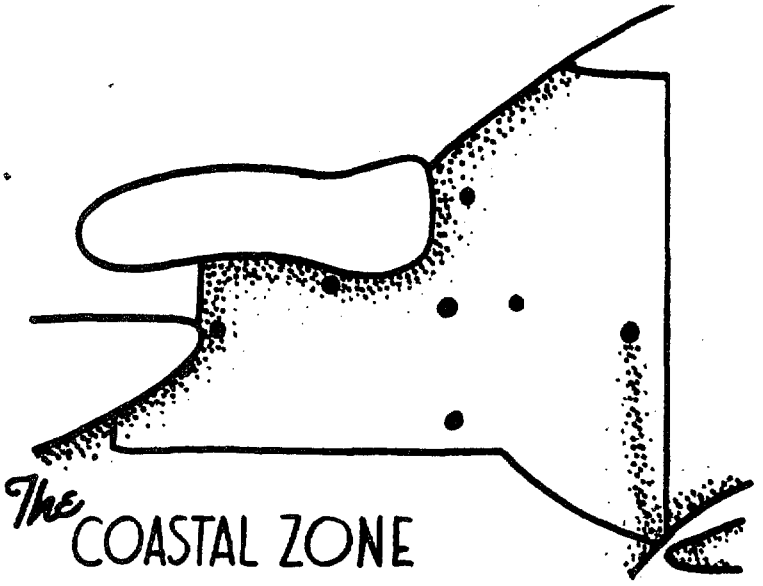
Passed in 1972, the Act calls for the protection and development of the land and water resources of the nation's coastal areas. Under the Act, states which adjoin coastal waters are eligible for grants to study coastal resources, to develop plans to guide the use of these areas, and to develop management programs to implement the plans.

OPS is the agency administering the program in New York State. One of the state's major functions in the program is to produce basic information and possible methods of managing our coastal areas, and to integrate them with existing planning, development, and regulatory activities of federal, state, regional, county, and local agencies.

Twenty-eight counties, including Cayuga and Oswego counties in Central New York, border coastal waters. Increased population and economic development have placed new demands on Lake Ontario and adjacent shorelands. These areas possess important scenic characteristics and ecological values which are threatened by this development.

Coordinated activities to protect these waters and shorelands will include delineating the study area, holding workshops, inventorying applicable regulations in effect, and analyzing land and water uses, especially those which endanger natural resources.

The RPDB is coordinating activities with the St. Lawrence/Eastern Ontario Commission as well as with the Black River/St. Lawrence RPDB.



Central New York's RPDB dertru

"It's in your hands"

The newsletter of the Central New York Regional Planning and Development Board Serving Cayuga, Cortland, Madison, Onondaga, and Oswego Counties

Thomas H. Dyer
Chairman

Robert C. Morris
Executive Director

Sue Lenkiewicz
Editor

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Central New York Regional Planning and Development Board
321 East Water Street, Syracuse, New York 13202

Central New York's RPDB destiny

"It's in your hands"

CENTRAL NEW YORK
REGIONAL PLANNING AND
DEVELOPMENT BOARD

Protecting Our Coastal Areas

The RPDB has received a $20,000 grant to finance a coastal zone management program for Central New York, under a program funded by the National Oceanic and Atmospheric Administration.

The RPDB, assisted by the Cayuga and Oswego County planning boards, is using funds granted to the New York State Division of Planning under the federal Coastal Zone Management Act. Passed in 1972, the Act calls for the protection and development of the land and water resources of the nation's coastal areas, including the Great Lakes. The law brings together social, economic, and ecological aspects of land and water use decisions at the local level.

Twenty-eight counties, including Cayuga and Oswego counties in Central New York, border coastal waters. Increased population and economic development have placed new demands on Lake Ontario and adjacent shorelands. These areas possess important scenic characteristics and ecological values which are threatened by that development.

Under the coastal zone act, states which adjoin coastal waters have responsibility for studying coastal resources, developing plans for guiding the use of these areas, and developing management programs to ensure that the plans are carried out.

State & Local Programs

One of the major functions of the Division of State Planning, the agency administering the program in New York State, is to identify coastal characteristics and develop possible methods of managing our coastal areas, and to integrate them with existing planning, development, and regulatory activities of federal, state, regional, and county agencies.

This placement of rocks on the Little Salmon River shoreline retards erosion and acts as a boat launching facility and refuge for fishermen during inclement weather.

How the Program Began

A little more than a year ago, the State began developing an application to be submitted to Washington for financial assistance to operate its program.

The RPDB assisted in the review and development of the State's program, which provides money to regional and county planning agencies to develop a local program, collects information from local areas in the State, and ultimately assists local governments in carrying out a management program to guide land and water development based on attitudes and desires of the citizens living in coastal areas.

The RPDB's own application for assistance from the State, submitted last Fall, was approved last May.

Scope of Program

One of our first responsibilities locally is to determine exactly how big the coastal zone is in this Region. The boundary of the coastal area is based on the degree of influence Lake Ontario has on the natural characteristics in this area. The tentative area is a relatively narrow band, running inland from the shoreline to Routes 3 and 104. In northern Oswego County it may extend to Interstate 81, to include the area likely to be affected by the salmon fishing program. The program will identify "critical areas" -- areas of unique or important natural resources, ecological values, historical/cultural significance -- to determine those areas which should be preserved or carefully managed because of their environmental sensitivity. The remaining areas in the coastal zone will be analyzed in terms of their appropriateness for various land and water uses, and will include those areas marked for industrial development.

It will be important to ensure that all affected groups and agencies are involved, so that the program can be conducted with the

(continued on page 2)

least duplication. The RPDB has held meetings with the Cayuga and Oswego County Planning Boards, the St. Lawrence-Eastern Ontario Commission, NYS Department of Environmental Conservation, and the Division of State Planning. We're also keeping in touch with neighboring jurisdictions -- the Black River/St. Lawrence Regional Planning Board and the Genesee-Finger Lakes Regional Planning Board.

To help guide the program and address local concerns, a five-person Technical Advisory Committee on coastal zone management is meeting regularly. Members of the committee are Erwin Fineout, retired superintendent of Fairhaven State Park; Robert Miller, Oswego County legislator and RPDB member; Richard Moore, director of the Lake Ontario Environmental Laboratories; Patricia Walrath of Cayuga County, member of the League of Women Voters and of RPDB; and John Zagame, RPDB member and NYS Assemblyman from the 117th District.

Next year the Regional Board plans to expand its program, and increase its efforts to seek citizen views on various problems in the Central New York coastal zone. The federal legislation has allocated two more years to the planning - - collecting information, analyzing it, and proposing improvements. Following that, local governments and the State will work together to guide the development of the coastal zone.

The Selkirk Lighthouse — one of the coastal zone's historic sites to be preserved.

Regional Board Projecting Future Air Pollution Levels

As a first step in meeting federal air pollution standards by 1985, the Central New York RDPB is conducting an analysis of air pollution in the urbanized core of the Region. The federal government has decided that regional agencies, because of their areawide approach to planning, can apply population and growth factors as well as industrial expansion plans to estimate future pollution. The U.S. Environmental Protection Agency (EPA) has awarded $10,000 to the RPDB for the analysis.

As part of the preparation of an Air Quality Maintenance Plan, the New York State Department of Environmental Conservation (DEC) will supply the RPDB with information on 1973 emission levels throughout Onondaga County, which is the Air Quality Maintenance Area for Central New York. RPDB will then look at those factors which influence future land use, transportation, and population and compare them with existing levels of pollution. From this information, the Board will then project air pollution levels in 1978, 1980, and 1985. Based on the RPDB's analysis, if future levels of pollution exceed the standards set by EPA then the NYS DEC must prepare a plan of action to ensure that these standards are met by 1985. The plan will be a step-by-step approach to solving local pollution problems; it will recommend methods of controlling industrial pollution, as well as land use plans providing for industrial and residential development at densities maintaining acceptable air quality standards. Carrying out the plan will ensure that we will meet national air pollution control standards.

The Regional Planning Board has just begun this project and will continue its analysis over a 10-week period.

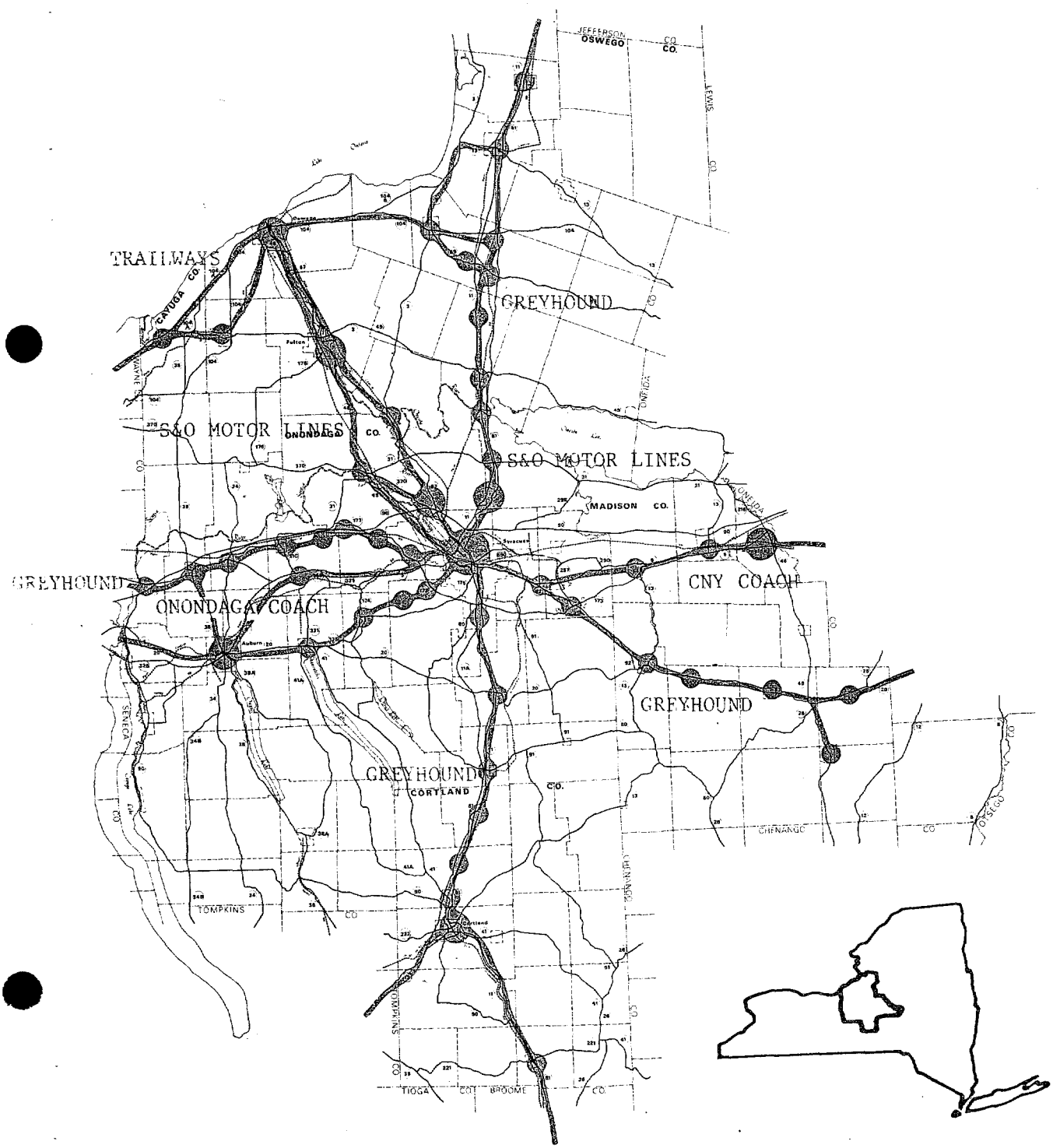
RPO3

INFO MAP

INTERCITY BUS CARRIERS IN THE CNY REGION

The Central New York Region is served by five private carriers: Greyhound, Trailways, Syracuse and Oswego Motor Lines, Onondaga Coach, and Central New York Coach. All but Trailways center their routes upon Syracuse. The five carriers together provide about 100 round trips during each working day. Service is provided to 53 communities along 6 corridors. The Syracuse-Oswego, Syracuse-Oneida, and Syracuse-Auburn corridors are provided with frequent service throughout the day and serve daily commuter needs. The Syracuse-Cortland, Syracuse-Sandy Creek, and Syracuse-Weedsport service is less frequent and is primarily intended for irregular trip making. Trailways Rochester-Watertown service via Oswego runs only on Fridays and Sundays.

THE CENTRAL NEW YORK REGION



CENTRAL NEW YORK
WATER QUALITY
NEWSLETTER

CENTRAL NEW YORK REGIONAL PLANNING AND DEVELOPMENT BOARD
321 East Water Street Syracuse, New York 13202

YOU CAN DECIDE THE FUTURE OF OUR WATERWAYS

Yes, this is another appeal - - and all we want is your time.

A new two-year water quality project has begun and is designed to give each of you in Central New York a chance to decide on the solutions to water quality problems in your community. The Regional Planning Board is coordinating the development of this water quality management planning program for the five-county Central New York Region and has scheduled completion of the plan by June 1977.

What does this mean? For once, the people who know most about pollution - - the people who live with it - - are going to help provide the answers. Local people like you will find and carry out environmentally and financially sound ways to solve both our surface and our groundwater pollution problems - - to have swimmable, fishable waters by 1983. This has been made possible through a federal program which is 100% funded under the federal Water Pollution Control Act Amendments of 1972.

And time is running short. We can no longer try to solve our problems one-by-one. It will take coordinated planning and coordinated management because dirty streams observe no boundaries. Governor Carey has designated the *entire* CNY Region as an area with severe water quality control problems. That's why we need the cooperation of our smaller communities, larger metropolitan areas, farmers, industries, developers - - everyone concerned with the healthy growth of this Region.

Old Hat

Of course, this isn't going to be easy. Although this management approach is new - - and unique - - it's applied to an old problem. Just about everyone, even the most sensitive listener, is "saturated" with water pollution stories. That's why we are so anxious to convince you that there is something positive to be achieved in giving your time to this water quality management program.

To give you a better idea of the scope of this project, here are some of our public information efforts in the program so far. We are setting up a network of local committees designed specifically to study local problems; we're working with all the Regional media (TV, radio, newspapers, specialized press) to inform you about the areawide program and localized pollution problems; we're preparing special displays and brochures; we're organizing informational meetings at the county level; and we've begun publishing this newsletter which will appear regularly with issues of *Destiny*.

This Publication

In each issue of *Water Quality* we'll keep you informed of RPDB staff and consultant work on the analysis of the Region's water and will report on regional and county-level committee activities and decisions. In addition, we'll run some generalized articles on water quality (for example, water sampling, stream clean-up projects, water quality and public health).

This newsletter will be one of the major contacts with you, so send us your comments, ideas, and suggestions for subject matter.

Most of all, read this issue carefully to choose how you want to be involved - - and contact us or your county planning board about being on a committee. Too often planning agencies forget they're supposed to help people make their own plans, but a well-informed public won't let us forget. And too often people complain about the problems facing them in their communities, but when given the opportunity to take action, they pass it up. So complain - - but PARTICIPATE too.

WHAT MAKES OUR WATER QUALITY PROJECT UNIQUE?

It's Complete

It looks at all factors that can cause pollution - - not only factories and sewage treatment plants which discharge municipal and industrial wastes, but also more generalized sources of pollution such as seepage from septic tanks, excessive runoff of soil, fertilizers, and pesticides from rural areas, and stormwater runoff from roofs, pavements, and lawns. These previously ignored sources of pollution are now being given attention.

It's Local

It stresses both planning and action by local governments and citizens. And who knows better about local water pollution problems than the people who live here? The program calls on local people to work together to come up with workable solutions they are willing to carry out.

It's Long Range

It will consider and be made compatible with Central New York's longer range goals for development and growth. Our land use decisions and our water quality program must be in harmony.

It's Effective

When a workable physical solution has been devised we'll pause, not stop. Our end product in this program is a specific, agreed-upon, effective course of action we're calling a Management Plan.

CITIZEN ACTION TO BEGIN

Although many of you have been helping us with our Regional water quality management program for many months, expanded involvement formally got under way at the first meeting of the Regional Advisory Committee on November 6. This committee is responsible for advising the CNY RPDB on the development, adoption, and implementation of a sound, financially feasible, and politically acceptable management plan. This regional advisory committee, however, is only part of a network of committees designed to get full citizen action in the planning process. (see chart below).

The Regional Advisory Committee is directly responsible to the Board and is the point at which all recommendations and problems throughout the Region will converge and be resolved.

Citizen, Technical, Elected Official Task Forces are created to get those people in the Region with special interest, special competence, or key positions to participate at the regional level. These task forces will elect their own leaders who will then serve on the regional advisory committee.

County-level Committees are created by each of the five county planning board chairmen who will organize them according to the unique situations within each county. These committees are especially important to ensure genuine participation by local communities. The committees will get people moving, assemble local viewpoints, resolve local problems, make recommendations to the Regional Advisory Committee, and be responsible for local public information meetings and for the distribution of materials. They will deal with local controversial issues and identify water quality problems, as well as advise the RPDB staff on the particular kinds of public information needed.

Regional Committee Members

In October, RPDB Chairman Vernon E. Rank appointed the members of the Regional Advisory committee. RPDB member Thomas H. Dyer, who has been active in water quality-related activities for many years, is committee chairman. The five county planning board chairmen, serving on the committee ex-officio, are Henry Tamburo, Cayuga; Carl Kimberly, Cortland; Howard Upham, Madison; Richard Grossman, Onondaga; and Joseph Fistick, Oswego.

Serving as Regional Planning Board members on the Advisory Committee are Robert Bays, Cortland County legislator; R. Donald Burch, general contractor; Howard Finley, retired vocational teacher; Gabriel Kiss, real estate broker; Robert J. Miller, Oswego county legislator; Millard Rogers, conservationist; George Schunck, Syracuse insuranceman; Patricia Walrath, Auburn civic worker; and Robert Weller, deputy clerk, Cayuga County Legislature.

Yet to be selected are the representatives from the three regional task forces discussed above, and representatives of the U.S. Departments of Agriculture, Interior, and Army Corps of Engineers who will serve on the committee.

Meeting Discussion

At the first meeting of this regional advisory committee, discussion centered on the organization and composition of the county-level committees, so important to the identification of local problems. Chairman Dyer emphasized that participation on the county committees of a wide variety of people is important, because public participation in the planning now will help elected officials make their decisions on the plan later.

As for the composition of the county groups, the regional committee members suggested involving a wide spectrum of people -- labor, business, industry, farming, education, youth, members of existing community action and conservation groups, environmental management councils, and others.

In structure, the committee suggested using one umbrella group to coordinate all groups within the county and to act as a decision-making body at the county level. In addition, they suggested that it might be helpful in some counties to organize subgroups for certain subjects or a certain geographical area (such as agriculture, or a group especially concerned about a particular lake).

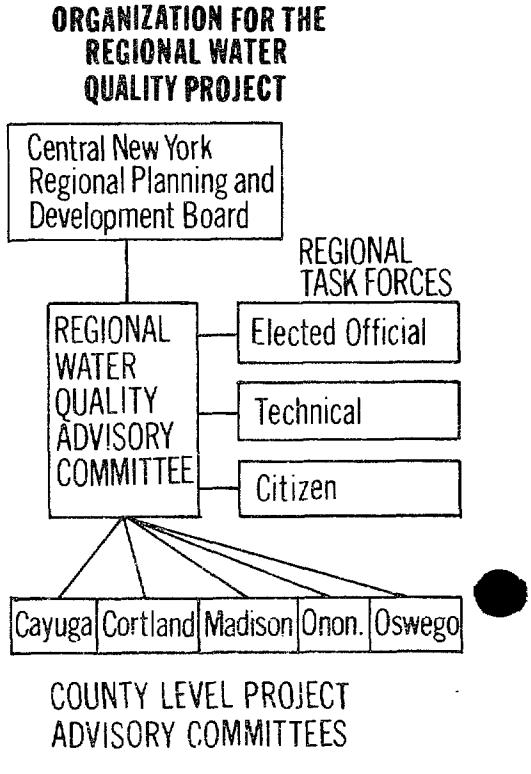
The committee agreed that the county committees should remain as open as possible in their membership, but should have a workable size.

Timetable

The committee has agreed to try to have core groups for county committees formed by the second week in December; orientation / organizational meetings of county committees before Christmas; and public informational meetings sometime after January 1st at times to be decided county by county.

Future issues of this newsletter will provide more specific information on these and other committee meeting decisions. In the meantime, we'll be sending information on the regional advisory committee meetings to such people as county planning directors and board members. This information will also be available at the Regional Planning Board office.

Note: County committees are now being organized. If you want to join, please contact your county planning board chairman.



Sell A Stream . . . Or Save It?

I approached the man behind the counter and said, "I'm curious about the trout stream you have for sale. Can you tell me something about it?"

"We're selling it by the foot; six dollars and fifty cents a foot. We're selling the waterfalls separately, of course, and the trees and birds, flowers, ferns, and grass we're also selling extra."

"How much for the birds?"

"Thirty-five cents apiece," he said, "But of course, they're used. We can't guarantee anything."

"Is the stream clear?" I asked.

"Sir," the salesman said, "I wouldn't want you to think that we would ever sell a murky trout stream here. We always make sure they're running crystal clear before we even think about moving them."

"Where did the stream come from?" I asked.

"Colorado," he said, "We moved it with loving care. We've never damaged a trout stream yet."

This is Richard Brautigan's subtle lament on the fate of our trout streams as found in his commentary, *Trout Fishing in America.*

The sale of a used trout stream is far fetched even for our pollution-conscious society - - - or is it?

Cold water streams in the Northeast *are* becoming polluted and unfit for trout reproduction. The vast majority of our Central New York streams do *not* run as crystal clear as that second-hand find from Colorado. And fisherman and other concerned people are seeking ways to recapture these water resources as they become scarce.

Habitat improvement is the key. If suitable habitat is lacking, then measures such as restrictive game laws and artificial stocking are useless.

Just as the human circulatory system carries nutrients and oxygen to our vital organs and takes away wastes and carbon dioxide, our waterways can be considered nature's lifeblood arteries. And in the same way that the kidneys and liver act to remove unwanted materials, nature uses a biological system to remove wastes and other harmful substances from our streams and rivers.

There is, however, a limit to the amount of impurities which can be handled by each of these systems. By overloading any one part of the human mechanism, stress is placed on the whole process and normal functioning is severely disrupted.

Yet our streams and rivers are being subjected to such treatment with industrial toxins, domestic sewage, road drainage, and siltation. The discharge of these pollutants directly into our streams creates conditions totally unsuitable to the continuation of natural cycles.

Obviously, water pollution control should be a vital concern to everyone, if not to stem inflation-mounting construction costs, then to meet the responsibility of leaving our children a viable, pollution-free environment.

The kind of waste control plan needed is a long-range, coordinated effort to steadily decrease the amount of pollution entering our streams - - - a cooperative plan such as can be developed by an areawide water quality management program that involves the public as well as the participating governmental agencies. Not only will this reduce the overall cost of the clean-up process, but who is better suited than the individual landowner, fisherman, or outdoor enthusiast to detect local sources of pollution?

People *do* have a way to point out sources of pollution around them.

Save Our Streams (SOS) is a program designed specifically to restore and protect the nation's waterways through the cooperation of landowners, farmers, conservation organizations, community action groups, and governmental agencies. The idea originated in Maryland in 1971 and was made a national project in 1974 when the Izaak Walton League of America promoted it to the League's more than 50,000 members. Since then, more than 100 streams have been adopted in 15 states.

To "adopt" a stream means that a group assumes responsibility for surveying a stream, then documents its problem areas, and refers those problems to the proper agencies, or simply sees that sedimentation, pollution, and litter laws are enforced. Like Central New York's water quality management planning program, the success of SOS depends on involving local people in the improvement of water quality. Citizens' groups in the Region have the ability to maintain clean water and to enhance fish and wildlife habitat by recognizing problems such as pollution discharges, water removals, and other stream alterations.

Local groups have already begun to "watch" streams in the Region. *The Federation of Sportsmen's Clubs* is working on habitat improvement in Limestone and Butternut Creeks and Bishop Brook, and will begin work on Fabius Brook next year. *Trout Unlimited's* "Water Watchers" take monthly water samplings of Butternut Creek and send their findings to the State Conservation Department.

The cost of improving the habitat of a stream is kept to a minimum when local people can do the work. But the biggest advantage of stream adoption is that it makes us spot problems in our backyards, and enables us to become more conscientious users of water resources.

For more information and a starter kit on stream surveying, contact: *Save Our Streams - - Adopt One*, The Izaak Walton League of America, Inc., National Headquarters, 1800 Kent Street, Arlington, Va., 22209, or call a conservation or community action group in your county.

Progress Report

The size of this program and the desire to avoid decision-making by outsiders has resulted in the RPDB supplementing its staff for the water quality project. *Walker Banning,* RPDB's environmental management specialist, has been assigned to be project manager. *Paul Babiarz,* a water quality specialist, is analyzing water quality data and rural non-point sources of pollution. Participation coordinator *Cynthia Brown* has been assigned the task of getting maximum Region-wide involvement in the plan. She has met with several local groups and the county planning boards to discuss their roles in ensuring participation, and has been working with our new Regional Advisory Committee. *Romeo Supan,* graphics artist, has already created displays and a logo for the water quality plan (see the nameplate of this newsletter). The RPDB has still to hire an engineer and a land use planner to assist in the water quality program.

Consultants

The RPDB has provided *New York State Department of Environmental Conservation* with $110,000 of the program budget for coordination and technical assistance. The Department has used part of this money to hire a sanitary engineer who will work on the Central New York project in Albany, because the state water quality plan must be in agreement with our areawide program. The State is also slated to hire another sanitary engineer to assist out of the Department's regional office in North Syracuse.

The RPDB is exploring the kinds of information which the *Soil Conservation Service* can supply on rural non-point sources of pollution, and considering appropriate roles for the *U.S. Corps of Engineers* and others.

Other Agencies

We need to know the extent to which CNY's waters are capable of absorbing wastes before we can manage our waters to meet water pollution standards. We get this information through the process of performing various tests on the water (such as temperature, volume of flow, acidity) at particular points in a stream to determine chemical and biological activity and in turn to know the water's capacity to accept wastes without becoming polluted. We've hired three consultants to survey our streams and to give us this information. *Pickard and Anderson of Auburn* has completed its testing of Skaneateles Creek and Owasco Outlet and its lab analysis as well. *O'Brien and Gere of Syracuse* has completed its testing of the Oswego, Oneida, and Seneca Rivers and is now developing the best way to interpret the information collected. *Stearns and Wheler of Cazenovia* could not complete its testing of Oneida and Nine-Mile creeks because of the high water flows caused by Hurricane Eloise. Stearns and Wheler will repeat its testing next summer.

Because there is not enough adequate information on the physical characteristics and quality of Cortland's underground water system, the RPDB has engaged *Dr. John F. Harsh,* professor of geology at SUNY Cortland, to perform tests. Thirteen wells are nearly completed in the Otter and Dry Creek basins. In addition, the Regional Planning Board has provided $93,000 to the Cortland County Legislature with which to hire the *U.S. Geological Survey* (USGS) to conduct a special series of groundwater tests. In close coordination with our water quality program, the USGS will spend an additional $93,000 to study water quality of the western branch of the Tioughnioga River in Preble Valley.

The management firm of *Peat, Marwick, and Mitchell* has assisted the RPDB in refining its work plan and the internal management procedures for administering the program.

We are now working out contracts with our five *county planning boards* for their assistance in such local activities as planning and the participation program.

The RPDB has sent out 68 requests for proposals to *engineering and management planning firms* as a first step in the selection of those major long-range consultants who will work with the basic data and make initial recommendations on the physical, financial, and institutional arrangements which will make up the Water Quality Management Plan.

ISSUE 1-75

REGIONAL WATER QUALITY PROJECT

_____ I'd like more information (meeting minutes, reports, brochures)

_____ I'd like to be involved

Name _____

Address _____

_____

Phone _____

Comments on Water Quality Newsletter _____

_____

_____

Please return to CNY RPDB, 321 East Water Street, Syracuse 13202

New/Improved Transit Planned

The RPDB has begun an initial Urban Transit Plan to investigate the need and potential for new or better public transit systems in the Region's small urban areas. A previous RPDB report, *Urban Transit Services Study*, identified four areas in Central New York which have no bus systems now but which have potential for transit services: Cortland, Fulton, Oneida, and the Baldwinsville-Radisson area. The initial Urban Transit Plan will refine the transit needs indicated in that earlier report and will also reevaluate transit services in Auburn and Oswego, cities now served by the Central New York Regional Transportation Authority.

We will evaluate each area individually to determine areas of potential transit demand. By using current land use information, we will identify "traffic generators," places which attract large numbers of people. We will also evaluate such population characteristics as income level, age, auto availability, and population density.

The RPDB, with close cooperation from the Regional Transportation Authority, will thus develop transit plans for the four previously identified areas now without any type of service, and will update the existing transit development plans for both Auburn and Oswego.

Specifically, these plans will define areas of large transit potential; recommended level of service; type of service and location of routes; timing and priorities for service; and the administrative and financial measures necessary to carry out the plans.

The Urban Transit Plan, then, will provide recommendations for Central New York's small urban areas to develop transit systems in the most efficient way possible — systems which are closely coordinated with the needs of the people who live there.

RPDB To Plan Coordination Of Region's Airports

Early next year RPDB will be developing its Regional Aviation System Plan. This will be the second phase of a three-phase program currently being conducted throughout New York State.

We are now in Phase I, in which the NYS Department of Transportation is identifying the State's objectives, responsibilities, and needs with regard to aviation services and facilities, developing a rational basis for allocating anticipated resources, and updating the Interim State Airport System Plan. Phase I began last January and will be 90-95% complete by the end of this year.

In Phase II, the RPDB will prepare an aviation system plan for our Central New York Region, in accordance with a Memorandum of Agreement to this effect entered into by the RPDB and NYS DoT in September 1973. The Regional Aviation System project will develop and evaluate various possible airport systems, and produce a long-range regional aviation system plan. The plan will recommend the locations of airports, by type of airport, and describe the specific functions each airport should perform in the system. The plan will also include a general timetable for implementation.

Developing a plan for the Region's aviation activities has been a high priority project with the RPDB since 1969, but has been deferred annually because of our desire to have the State perform a "framework" study first. With the State now doing Phase I, with several airports in the Region currently updating their master plans, and with our own and other studies of highways, rail, bus, and the port — all either recently completed or under way — the prospects for a coordinated transportation plan are now very good.

The Plan's Considerations

The development and operation of a major airport requires a substantial capital outlay, a continuous investment to maintain facilities, and a land area usually larger than any other single land use function. In urban areas, the economic and environmental impacts of this investment in land are compounded by urban population densities, and greatly influence the region in which it is located.

There are constraints on selecting airport locations. For one thing, the airport cannot be far removed (in time or distance) from its market area. Secondly, airports use large parcels of land. Third, they are employment generators. Fourth, they must be interrelated with other methods of transportation, since transportation connections are important in completing a trip. Fifth, there are social and environmental impacts which affect other than just the immediate surroundings.

Our study, which will consider the relationship of aviation to these factors, will take approximately 15 months, and consultant assistance will be required. A Federal Aviation Administration (FAA) planning grant will cover two-thirds of the project cost, with NYS DoT picking up three-fourths of the remainder. Both the FAA and the NYS DoT Planning and Research Bureau will be participating with us in Phase II.

As with every major study, the RPDB plans to call upon others in the Region to assist the Board throughout the study. We are counting on the participation of technical advisors such as local airport operators, airline operators, and the Regional office of NYS DoT, as well as business groups, airport users, local interest groups, and others interested in aviation.

In Phase III, the NYS DoT will work with the State's various regions to combine their plans into a State Aviation System Plan. Local airports will also be able to finalize their airport master development plans. In addition, the NYS DoT will establish procedures for keeping all levels of the State's aviation plans up to date.

Regional Planners Will Advise On Port Study

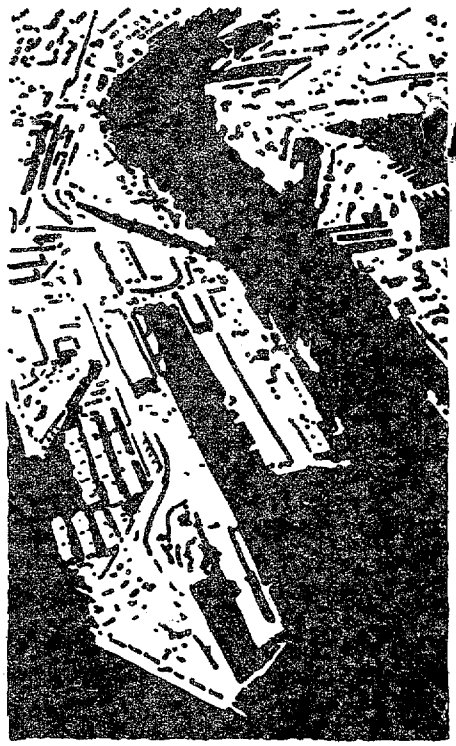
Because waterborne transportation is an important part of a transportation system, the New York State Department of Transportation has begun to reexamine the use of public ports in upstate New York. The Upstate Port study, scheduled to be completed in July 1976, will address broad transportation considerations and the common concerns and problems associated with the ports of Albany, Buffalo, Rochester, Oswego, and Ogdensburg. The study will include possible revisions in regional port authority boundaries, financial support, port charges, and programs for port development. From this reexamination, DoT will then develop recommendations to be included in a comprehensive upstate port plan.

The State, with major assistance from a consultant, has already begun technical work on the $170,000 project, and will administer the study and oversee its state-level aspects. However, throughout the course of the study, DoT is relying on a technical advisory liaison group for coordination and information resources and for guidance and critical advice. Among participants in the advisory group from this Region are members of the Regional Planning Board, the Port Authority of Oswego, and the Oswego County Transportation Study.

The Regional Planning Board is asking interested groups, agencies, and private citizens in the five-county Region for their comments on the study's first phase, which includes the potential economic role of the Port of Oswego, which is used to transfer cargo between waterborne transportation and railroad and truck transportation. Ports like the one in Oswego can enable a shipper to move his goods at the lowest possible cost.

The Regional Board will also assist in gathering information for the State on industries currently using the Port of Oswego, its potential users, and how much cargo will be shipped if the port is used to its fullest potential. In addition, we will help to review all drafts of reports and will keep local officials abreast of the study's activities.

While the emphasis of the study is on how the Oswego port can regain trade for the Region, participation from private citizens is needed to fully integrate environmental and social concerns with the planning of transportation facilities throughout our five-county Region. The Phase I report is available for review at the RPDB office.



Central New York's RPDB destiny

"It's in your hands"

The newsletter of the Central New York Regional Planning and Development Board serving Cayuga, Cortland, Madison, Onondaga, and Oswego Counties.

Vernon E. Rank
Chairman

Robert C. Morris
Executive Director

Susan Lenkiewicz
Editor

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Central New York Regional Planning and Development Board
321 East Water Street, Syracuse, New York 13202